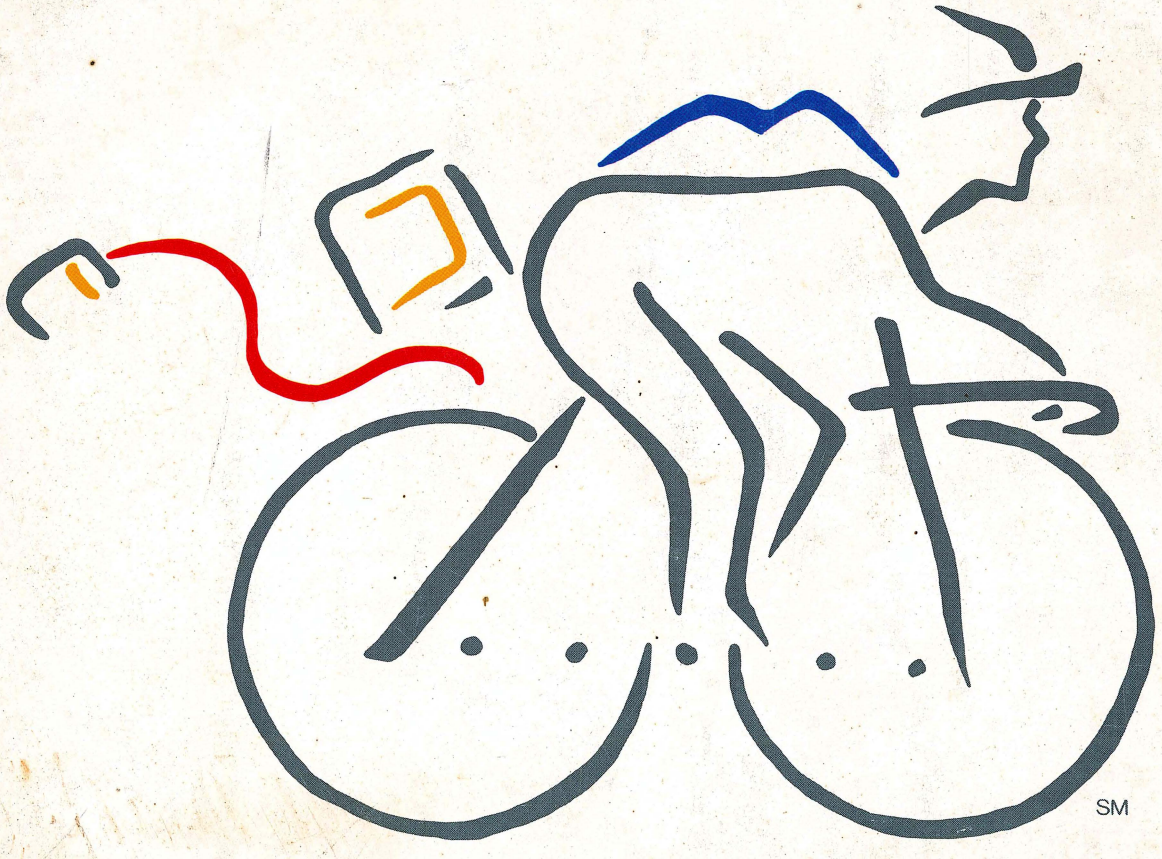
Macintosh™

WHEELS FOR THE MIND

An Apple University Consortium Publication Prepared at Boston College

Issue #2 March 1985



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Based on the responses we have received, our publication seems to have found a place among the vast sea of Macintosh™ publications. This acceptance is due partly to the fact that some of what we cover is rather unique. In particular, the section that deals with "work in progress" at schools in (and outside of) the Consortium is quite valuable to the Macintosh user community. In addition, the "one-stop shopping" approach to providing information about Macintosh hardware and software products seems to be well received. In future issues, we hope to become even more unique by incorporating articles by some of the designers at Apple Computer who have been developing products for the Macintosh.

Never lose sight of the fact that this publication is entirely dependent on your cooperation, efforts, and contributions. Please help out. Send articles, reviews, product developments, and reactions to the editor at Wheels for the Mind, Boston College - Fulton 430, Chestnut Hill, MA 02167. Don't think about it, do it !

There are some questions that we, as members of educational institutions, should raise and begin to discuss. Perhaps part of this publication can become a forum for issues related to the use of the microcomputer in education. For example, we might wonder when the Macintosh will infiltrate the elementary and secondary school curricula? What influence can we have, collectively, on the design of the next Macintosh? How can educators who are not computer oriented be best introduced to the power of the microcomputer? How can we best interface with our international colleagues?

I would like to see **Wheels for the Mind** become both a network for linking schools here and abroad into the applications available on the Macintosh, and a two-way conduit for the schools and Apple Computer. Apple is supportive of this idea. We merely need to organize ourselves in the most effective manner for gathering data for presentation of our collective ideas and suggestions. Your suggestions would be quite warmly received!

You will notice that there are a few changes to the current issue. We are beginnning to incorporate some graphics. Some sections have been modified. Material that is still relevant from the previous issue is displayed in smaller type. Additional changes are likely to occur as we begin to use some of the publication preparation software about to reach the market. Since this is intended to be a publication for all schools, please let us know what you would like covered.

Many thanks to Jerry Keough of Boston College for his help with the graphics in this issue.

Peter Olivieri
Boston College

Dialog Box

The "DIALOG BOX" section will present articles on a wide variety of topics. They may include descriptions of local area networks, strategies for involving faculty in microcomputing, new course designs, outlines of seminars, suggestions for Apple Computer, or whatever you wish. Please participate. Write something for us and share it with our community of Macintosh users. Send your articles to:

Peter Olivieri
Wheels for the Mind
Boston College - Fulton 430
Chesnut Hill, MA 02167

ITEM 1. STRATEGIES FOR INCREASING INVOLVEMENT AND AWARENESS ON YOUR CAMPUS

One way that all of us Macintosh converts can benefit is to involve as many of our friends and colleagues as possible in our Macintosh information network. In order for this to be successful, we must be proactive and plan events that will facilitate their becoming more knowledgeable about the power of this "insanely great machine." If you have some specific ideas on how to achieve this end (or if you have some great success stories), please let us know. We will feature them in our next issue. For now, here are some suggestions that may stimulate some ideas on your part.

First, there are two "arenas" in which you can focus your efforts: (1) the off-campus community, and (2) the on-campus community.

OFF-CAMPUS ACTIVITIES

It is important to share the knowledge gained through your own development efforts, through the consortium schools, or through your affiliations with other universities and educational institutions.

One of the ways in which you can do this is to hold local demonstrations of Macintosh hardware and software products. These sessions could be presented by a faculty member, a member of your local user group, an AUC contact, a vendor, or even yourself. There are several formats that such sessions might take. You may find that, in your community, one full day session is the most effective way to attract attendees. On the other hand, you may prefer to hold such sessions on every third Friday evening for an hour or two.

In these sessions, you can showcase your local talent, your equipment, your

software, and your college or university. In addition, you may be providing a real service to schools in your area that are not "wired into" the microcomputer and its applications in the educational environment. You might sponsor a program for some of your local high school teachers. Perhaps there are other schools and colleges in your area that would be interested in attending.

Here are some sample topics you might use to kick off your program this summer and next fall :

- Networking the Macintosh™
- Word Processing for Faculty
- Applications of Spreadsheets in the Sciences
- Microcomputers in the Science Lab
- Managing Data: Microcomputers in Business
- Microcomputer Applications at .....
- Educational Microcomputing with the Macintosh™

ON-CAMPUS ACTIVITIES

It is even more important to make sure that information about the Macintosh is disseminated throughout your own institution. Sometimes, we get sloppy and forget that there are many faculty, staff, and students in our very own environment that we have not yet reached. Here are some strategies for ensuring thorough distribution of Macintosh-related material throughout your campus. How many have been followed on your campus? Be an advocate! Don't leave it up to someone else. Do it yourself. Now!

1 Place copies of **WHEELS FOR THE MIND** in your school's library.

2 Place copies of **WHEELS FOR THE MIND** in your microcomputer lab.

3 Start a local user group and distribute information to its members.

4 Establish electronic mail or bulletin boards on your school's mainframe computer.

5 Occasionally use a Macintosh in your lab for real-time signup lists.

6 Hold regular seminars for faculty, staff, and students.

7 Hold an alumni seminar on microcomputer applications.

8 Write a regular column on Macintosh applications for your school newspaper.

9 Invite several hardware/software vendors for an Applications Fair.

10 Run a campuswide MacPaint™ contest . (This one really works.)

11 Occassionally announce a Macintosh "hands-on" room for prospective users.

12. Have a "freeware" day where public domain software is distributed.

13. Introduce your faculty to Macintosh by running Faculty Workshops on Macintosh applications.

14. Get your local TV or news media to profile the unique Macintosh activities at your school.

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ITEM 2. TEACHING ASSEMBLY LANGUAGE ON THE MACINTOSH

Last fall, two colleagues and I taught a course in the **MC68000 assembly language** for approximately 100 students (mainly mathematics and computer science majors). Our experience was a positive one, primarily due to two factors. First, Apple was generous enough to supply prerelease versions of the Macintosh 68000 Development System (MDS). Second, we were able to put together an "environment" in which students could execute their programming assignments. Looking back, the construction of this software on our end was not as complete as we would have liked, and was often revised, quickly tested, and distributed to the students only days ahead of the students' need for the newly implemented features! Nevertheless, we were pleased with the result, albeit worn out by some late-night programming and debugging sessions, after receiving the latest release of the MDS perhaps only hours before.

In teaching our course, we approach the 68000 assembly language as if it were a high-level language. We consider programs to do arithmetic, create arrays and record structures, and manipulate their contents. The basic data types are integers, strings, and pointers. Technical discussions are added only as needed. Issues concerning I/O are taken for granted, and macro instructions to read and write both strings and integers are included in the student's available list of primitives. Only after the higher-level programming concepts are understood do we deal with other "traditional" assembly language issues such as bit and logical operations, architecture, and execution sequencing.

For example, we created the input instruction **.getnum**, which is very much the equivalent of a (numeric) BASIC INPUT statement. Valid input is returned in register **D0**. For output, we created the instruction **.write** to print a string (as in .write 'hello') and **.outnum** to write out the signed integer value in register **D0**.

Creating I/O macros for the course, however, implies the creation of some window structure in which the I/O takes place. We supplied the necessary coding to set up a spartan menu and window structure to which the student's program would be linked. Then, as the program began its execution, the student could choose a "GO" option from an "EXEC" menu, and all I/O would take place inside our window, which acted as a simple "terminal" to the student program.

This **Supervisor program**, as we called it, supported desk accessories; allowed

the window to be dragged (but not resized), and cleared of previous I/O material; allowed scrolling (with the usual interface conventions) of the text that appeared in the window; and could transfer directly back to the Edit application of the MDS for further program development after the completion of the student program. A debugging macro called **.debug** could be included in a student's source code to pause the program and open up a second window showing the contents of all internal registers. Further, when programming errors surfaced during execution, which generated the "bomb" message, the **Resume** button of the resulting dialog was enabled to restart the program.

One other area where we made progress was in setting up diskettes for the students. We altered the Monaco and Chicago fonts to avoid any confusion in similarly formed characters (for example, we put a slash through the zero character). We trimmed out excess fonts and desk accessories. Consequently, we produced a **single-disk system** that contained all of our pre-assembled coding and still left about 105K of free disk space.

We have some students working on enhancements to the **Supervisor** this semester. Last Fall, our students had to get "window dumps" to obtain hardcopy output, but a complete "print" option is planned. Other items for the next release are file I/O and (maybe) sound primitives. Although our course did not cover Macintosh graphics in the output window, they are already available in our environment.

We'll be happy to send what we have to you if you think it will be useful and you send us a diskette. The source is written in MDS 68000 itself, and the **Supervisor** is completely (we think) transparent to the user with the exception of a single "include" statement at the beginning of the student program.

Jerry Keough
Associate Professor of Mathematics
Boston College
Chestnut Hill, MA 02167

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ITEM 3. DISTRIBUTING SOFTWARE

Over a year has passed since the Macintosh was introduced. It is getting close to the time that decisions have to be made about the distribution of software among schools that have been developing things. People have many and varied ideas about this. Some feel that such educational software should be distributed freely (literally), with a charge only for the replacement cost of the disk. Others argue that distribution should be handled just like a business. Some schools prefer to set up their own distribution organization... sometimes for profit, sometimes for free. We need some creative ideas here.

To stimulate some responses from you all, we are including some comments to which we hope you will react. PLEASE SEND US YOUR REACTIONS, FEELINGS, SUGGESTIONS, and IDEAS. The schools can be best served by getting feedback from

everyone involved. It only takes a minute to jot some reactions down and send them to Peter Olivieri, Editor, **WHEELS FOR THE MIND**, Boston College, Chestnut Hill, MA 02167.

COMMENTS ON THE DISTRIBUTION OF SOFTWARE

There are several issues involved in the distribution of software developed at colleges and universities. First, however, it is necessary to speculate on the different kinds of software that we might be talking about. I would categorize such software as probably falling into one of the following categories.

LEVEL 1 SOFTWARE: Developed by a student, staff member, or faculty member this software is really quite simple and is not really commercially marketable. It would have interest for people in the educational setting. Little documentation probably exists (and is not necessarily needed). Some fonts would fall in this category. Perhaps some programs that demonstrate a particular topic being discussed in a course would fit here. This software should be shared (either by mail or electronically) for only the cost of the materials. Generally, the author would determine whether or not an application fell into this area.

LEVEL 2 SOFTWARE: Some software developed by a student, staff member, or faculty member takes an already existing application package and adapts it to a particular educational or business environment. To take advantage of this software, users have to own (or have access to) the original tool. Examples might be BASIC programs, Pascal programs, Multiplan™ spreadsheet templates, Filevision™ database picture files, slide shows for use with Slide Show Magician, and so forth. Level 2 software might be shared freely or, if substantative enough, be distributed commercially.

LEVEL 3 SOFTWARE: This would be originally developed software (with the Workshop or C, or some other development language) that is, indeed, of commercial quality. This means that there is excellent documentation as well as an adherence to the Macintosh user interface. In addition, it is a well-tested and well-supported product.

WHO WOULD DISTRIBUTE THE SOFTWARE?

Regardless of the level of software, there are several methods of distribution to choose from.

1 Market and distribute it **yourself** (either through the school, an independent corporate entity, or your own business).
2 Announce it to schools through vehicles like **WHEELS FOR THE MIND** and **fill orders** (free or otherwise) as they come in.
3 Add your software to an **electronic database** of applications and allow others to download it to their own environments whenever they wish.

4 Seek out a **third-party vendor on your own** to market, promote, and distribute, your software.
5 Give your software to a Consortium-UPP-International-**approved third-party vendor** for distribution. Schools would, collectively, have some input over the policies and procedures of this particular operation.

SOFTWARE MARKETS

Regardless of who distributes the software, there should be two distinct target markets. One is represented by **other schools**, the second by **everyone else**. One could argue that, in the Apple spirit of sharing, appropriate discounts should be provided for those at schools who wish to utilize software developed by others in the program.

RELATED ISSUES

The problems are not simple ones. There are a host of related issues. For example :

1 What copy protection procedures should be used?

2 What is the realtionship between the faculty-student-staff author and the school or college at which development took place? How would payments be distributed?

3 If a school is willing to freely share their software, who will make copies of the disks? The documentation? Handle the mailings?

4 If electronic transfer is utilized, who will set up such a system? Organize it? Update it? What system would be used? Would certain "less electronically literate" schools be excluded? What would be the fee for using such a system?

5 If a third-party vendor were used, how would it be selected? What fees would be involved?

6 When we speak of "schools", what schools do we mean? All schools across the country? Colleges and universities only? Consortium-UPP-International schools only?

7 What role, if any, would Apple play in the distribution of software?

Perhaps you have some ideas of your own. Obviously, a resolution to the problem of software distribution would be very, very beneficial to us all. The quicker we make some decisions, the better off we'll be. I would be glad to be the central clearing house for all of your suggestions.

ITEM 4. THE MACINTOSH™ OFFICE SYSTEM

As part of the Macintosh Office, Apple has introduced two new products: (1) the **AppleTalk™ Personal Network** and the **LaserWriter**.

THE APPLETALK PERSONAL NETWORK

This network can support up to 32 devices, such as computers and peripherals, within a work area of about 1,000 feet. Since each station costs only $50 to hook up to the network, it is an extremely cost effective way to link machines, hard disks, and printers together.

THE LASERWRITER

The LaserWriter is a high-resolution printer that allows business users to produce publication-quality text and art-department-quality graphics from their personal computer workstations. Thus, letters, forms, envelopes, reports, and transparencies can have excellent resolution.

One such printer can be shared by up to 31 personal computers in a workgroup (using the AppleTalk Network). In addition, the LaserWriter has an RS-232 port that enables it to be connected to devices outside of the network. Through a built-in program to emulate the Diablo 630 printer, IBM® and IBM-compatible personal computers using WordStar® or other IBM software can print directly on the LaserWriter with no software modification. Basically, the printer achieves full-page 300-dots-per-inch output through a Canon LBP-CX10 engine, a built-in Apple computer (12-megahertz Motorola 68000 microprocessor with 1/2 MB of ROM and 1 1/2 MB of RAM), and a software language called PostScript™. The LaserWriter's suggested retail price is $6,995.

PLANNED PRODUCTS

Apple plans to develop a file server (no formal name as yet) with both 20-megabyte and 40-megabyte capacities. It will have a built-in computer, software that provides for file transfer, electronic mail, print spooling, and self-contained file management software.

Products will be developed to interface with the IBM world at three strategic points : mainframe corporate databases, System 36, and the PC/PC network. Apple's existing data communications products promote coexistence by allowing the Macintosh to communicate with other systems. MacTerminal provides single-user interface to a broad selection of computer environments, including the IBM 3270 and DEC® VT100 terminals. The Apple Cluster Controller provides a pathway between Macintosh and IBM

networks based on bisynchronous or system network architecture (SNA) protocols. With either the Cluster Controller or with AppleLine, which emulates a 3278 terminal, the Macintosh family can talk directly to IBM in 3270 protocols.

Apple and third-party developers will provide gateways from AppleTalk into different IBM host computing environments. It is expected that Macintosh users will be able to exchange revisable documents with IBM systems through the DIA/DCA format. To integrate the IBM PC into The Macintosh Office, Apple will provide an AppleTalk card for the IBM PC that puts it onto the AppleTalk Network, with software that will allow it to print on the LaserWriter and to use Apple's planned hard-disk file-server product.

The Macintosh Office	**A+ Magazine**	March 1985	P. 26
The AppleTalk Personal Network	**A+ Magazine**	March 1985	P. 35
Apple's LaserWriter Printer	**INFOWORLD**	2/11/85	P. 15

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ITEM 5. "I'VE GOT A GREAT IDEA, BUT HAVE NO COMPUTER EXPERTISE AT ALL!"

Colleges and universities tend to attract bright, creative, and innovative people. This is not to say that it is only at these places that such people are found. Certainly quite the opposite is true. However, since we are a community of such institutions, it is appropriate to address how we might "organize" such talent.

In most schools, there are a fair number of individuals (faculty, students, and staff) who are quite innovative and creative but have little technical skill when it comes to using computer resources. These individuals can contribute greatly to the development of applications on the Macintosh™ The problem is one of tapping into their expertise (in teaching, writing, research, art, music, languages, or whatever).

The first step is to "win them over" by making them aware of the great things the Macintosh can do. This might be accomplished by having special Macintosh training sessions, full-day fairs, hands-on rooms, and such. This is not usually the difficult part .... the Macintosh really sells itself well.

Once you have some advocates, the next step is to get them involved in the development of some applications. One strategy for doing this that seems to be successful is the formation of an application development team. The composition of such a team may vary from project to project, but it generally would have members with the following skills :

o The **idea person**. This is the person with the creative notion and area expertise.
o The **technical person**. This is the Inside Macintosh expert (or someone with skills in another development language).
o The **organizer**. This is the person who helps organize, direct, and interpret what takes place between the idea person and the technical person.

Depending on the project, there may also be :

o A **curriculum expert**.
o A Skilled **teacher**.
o A **writer** to prepare user guides and documentation.
o A business-wise **manager** to deal with distribution and marketing (if appropriate).

All of the above may, indeed, be combined in one person. It is more likely, however, that it will be neccesary to have several participants in order to accomplish any meaningful development. You might consider setting up an on-line database at your school. (It might even be something on a MACINTOSH in your local lab. This database could keep track of a person's name, local address, and phone number as well as about five areas of special interest, and five areas of particular expertise. With such a system, those who might be looking for a "team member" to help implement a proposed system could do an on-line search to locate candidates for such a joint venture.

In fact, you should not restrict yourself to your own institution. One of the purposes of forming the Consortium (and other relationships with schools) was to foster collegial joint development. Wouldn't it be great to have a centralized, on-line database like the one just described above that contains the names of people from schools all across the nation and from the international scene who are interested in becoming part of a joint development effort? Let's do it!

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ITEM 6. PLANS FOR A SCHOLARLY JOURNAL

Apple Computer will shortly be announcing plans to work with a leading publisher in the development and distribution of a scholarly journal devoted to the Macintosh. While the conceptual design and format of the journal are still in the early stages, the planned bi-monthly forum is intended to become the periodical of record for campus-based research and demonstration activities. I am sure that both Apple and the publisher would welcome your ideas. If, for example, you were designing the first two issues, what articles would you include?

Send along your suggestions and reactions to:
Dr. Alan Brightman
Apple Computer Inc.
20525 Mariani Avenue, m/s 23-DU
Cupertino, CA 95014.

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ITEM 7. INTERNATIONAL CONSORTIUM NEWS

Representatives of the nine Australian Consortium schools met in November to organize themselves and assign responsibilities for Consortium activities. **The Centre for Tertiary Studies at the University of Western Australia**, will act as a clearing house for all Macintosh software evaluation.

It soon became clear to Macademics at the University of Western Australia that some customized materials would have to be designed for those who needed to learn the basics of word processing and graphics quickly. To fill this need, the Centre for Tertary Education Studies wrote a handbook called Cracking the Mac. It includes illustrated tutorial guides to the Macintosh, MacWrite™, and MacPaint™. In addition, there are sections on how to avoid losing your work, and lots of tips and techniques about using the Macintosh. It is available for US$5.00 plus postage, from University Extension, The University of Western Australia, Nedlands, Western Australia 6009. There is a ten percent discount if 50 or more copies are ordered.

WELCOME UNIVERSITY OF COPENHAGEN. All schools join in welcoming the University of Copenhagen to our World Consortium of schools. The Danish government has also selected the Macintosh as the personal computer for use in all ministries and education.

CANADIAN UNIVERSITY CONSORTIUM MEMBERS. Our friends up north are growing in number. I am sure that we can expect a good deal of sharing and communication to occur. For your information (you should all be keeping a File of International Consortium Schools), here are the names of the Canadian Consortium Schools.

UNIVERSITY OF TORONTO
Professor David Nowlan, VP of Research & Governmental Relations
Simcoe Hall, 27 King's College Circle
Toronto, Ontario
Canada M5S 1A1

YORK UNIVERSITY
Mr. M.I. Taylor, Asst. VP of Computer Services
030 Steacie Science Library
4700 Keele St.
Downsview, Ontario
Canada M3J 1P3

UNIVERSITY OF ALBERTA
Mr. John Stasiuk, Director of Micro Computer Systems
#103 General Services Building
Edmonton, Alberta
Canada T6G 2R3

SIMON FRASER UNIVERSITY
Mr. A.R. Stanley-Jones, Acting Director
Computing Centre
Burnaby, B.B.
Canada V5A 1S6

UNIVERSITY OF BRITISH COLUMBIA
Mr. A. Fowler, Director of Computing Centre
6356 Agricultural Road
Vancouver, British Columbia
Canada V6T 1W5

The inclusion of our prestigious neighbors from the international environment will certainly enrich our quest for quality educational applications of the microcomputer. And, to all those schools, we cordially invite you to send us your experiences, projects, hopes, and plans. Let us create a truly international network of communication.

ITEM 8. WORK IN PROGRESS REPORT FORM

Please make dozens of copies of this page. Complete as many as you can and send them to Peter Olivieri, **WHEELS FOR THE MIND**, Boston College - Fulton 430, Chestnut Hill, MA 02167. It is only with your support and participation that this publication will be successful.

DEVELOPER'S NAME(S) _____

SCHOOL _____

ADDRESS _____

_____

_____

PHONE NUMBER _____

PROJECT TITLE _____

DESCRIPTION _____

_____

_____

_____

_____

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_____

EXPECTED COMPLETION DATE _____

(Use back of this paper for additional comments, descriptions, etc.)

ITEM 1. DIAL UP TECHNICAL HELP FROM APPLE

Apple's Technical Support Service for Macintosh is for Apple customers who plan to develop applications on the Macintosh. This service will provide quick access to technical information and answers to all technical inquiries. Support is delivered via an **on-line telecommunications** system. You sign up for this service for a six-month period (or for 30 connect-time hours). There are five components to this **Technical Support Service**:

- **THE NEWS CENTER** allows for on-line retrieval of current news regarding the Macintosh.
- **THE INFORMATION CENTER** provides on-line retrieval of detailed technical notes and an archive of news items relevant to Macintosh development.
- **THE RESEARCH CENTER** allows on-line retrieval of summaries of questions submitted by subscribers, along with their resolutions.
- **THE MESSAGE CENTER** allows the subscriber to request assistance and to report items of interest. Replies are posted to the subscribers on-line mailbox.
- **THE DOCUMENT CENTER** provides on-line retrieval of documents relevant to Macintosh software development, including **INSIDE MACINTOSH**.

The following are currently supported :

- The Macintosh Development System
- **Inside Macintosh**
- The Software Supplement
- Pascal and C Workshops on Lisa®
- Macintosh Finder/OS
- Assembler/Debugger - Macintosh 68000 Development System
- Resource Editor
- Macintosh BASIC and Macintosh Pascal
- AppleTalk and peripherals

In order for you to take full advantage of this service, you will need to have a 300-baud or 1200-baud Bell-compatible modem and a terminal or microcomputer with terminal emulator. You should also have a Macintosh Development System which consists of :

- Macintosh Personal Computer
- Macintosh XL with an extra 1/2 Mb of RAM
- ImageWriter™ and accessories
- Lisa Pascal Workshop

o **Inside Macintosh**
o Software Supplement

To order, contact your Apple sales representative. Remember, you must be an Apple-approved customer. The product number for the **Technical Support Service for Macintosh** is SF70004.

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ITEM 2. LISA (yes, Lisa) TECHNICAL SUPPORT

In January, Apple Computer discontinued free service on the Lisa Hotline. InterSol, Inc. has arranged with Apple to assume responsibilities for providing **technical help for Lisa owners**. There will be a charge for this service (see below). Generally, questions will fall into one of the following areas:

- Installing software or peripherals.
- Using certain features or functions of your system or software.
- Getting around problems you encounter in a program.
- Finding out what your software does.

A subscription to TechniCall™ Support Helpline entitles you to ten solutions. You have one year to use up your ten solutions. The hours of operation are Monday through Friday from 9 A.M. to 8 P.M. and Saturday from 10 A.M. to 6 P.M. (all times are eastern time). The cost for ten toll-free solutions is only $89. A "pay as you go" service is available for $10 a solution. For more information, call 800-553-4000. TechniCall™ is a service of InterSol, Inc. 75 Hancock Street, Braintree, MA 02184.

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ITEM 3. USING THE DIALOG MANAGER

One of the things I hate doing in Pascal programming is including lots and lots of global variables. However, to access many of the Toolbox routines, I often have to do exactly that. For example, if you want to recover the text from a dialog box, you can't simply pass a handle for the dialog and the item number in the dialog item list, and get a string back. Rather, you must pass the handle and the item number to the routine GetDItem, and get back the type of the item (we already know it to be an EditText item, of course), a handle to the item, and the rectangle it occupies (which is not of any concern in our case). Then, we must pass the item handle onto GetIText to recover the string. Voila - more variables to declare and confuse you!

My remedy is as follows: I create a procedure called GetDText which is built to my specification of handle and item number input, and string output. This procedure then has its own declarations to hide the need for the excess variables.

Other situations I've encountered in dialogs are the need to put integer and real values

into EditText items, and to later recover them. Enter procedures called SetDInteger, SetDReal, and so on. Further, since the dialog manager knows text strings, but not integer and real values, it is necessary to validate any text input as a legitimate real or integer. Thus, the function GetDInteger accepts a handle for a dialog and an item number, and returns false if the text entered in that item is a not a legitimate integer string, or else returns true along with the correctly converted value through another parameter if the input is OK. It's easy to use such a procedure in the form: if GetDInteger(handle,item,value) then process_input(value) else Alert('NO GOOD').

Lastly, I've defined, but not coded, the necessary string conversion procedures for the dialog routines to be used. That's an exercise for the reader.

Jerry Keough
Associate Professor of Mathematics
Boston College
Chestnut Hill, MA. 02167

```
{ ---- support routines defined ---- }

function valid_int( x: str255 ): boolean;
    { returns true if the string x is a correctly formed integer }

procedure str2int( str: str255; var i: integer );
    { converts the already valid integer string str to its integer value I }

function valid_real( x: str255 ): boolean;
    { returns true if the string x is a correctly formed real }

procedure str2real( x: str255; var z: extended );
     { converts the already valid real string str to its real value z }

procedure real2str( x: extended; places: integer; var y: str255 );
    { converts the real x into string y, with places decimal places }

procedure trimreal( var y: str255 );
    { removes trailing zeros from the right of the real string y }

procedure int2str( x: integer; var y: str255 );
    { converts the integer x into string y }

{ ---------- Dialog I/O simplifications ---------- }

procedure setDtext( dial_ptr: dialogptr; item: integer; str: str255 );
          { sets up the text in str to appear in item number item in the current dialog with handle dial_ptr }
    var box: rect;
          item_hndl: handle;
          ty: integer;
    begin
          getditem( dial_ptr,item,ty,item_hndl,box );
          setitext( item_hndl,str );
    end;

procedure setDinteger( dial_ptr: dialogptr; item: integer; value: integer );
          { places the integer value into the dialog with handle dial_ptr at item item (as text) }
```

```
    var str: str255;
        box: rect;
        item_hndl: handle;
        ty: integer;
    begin
        int2str(value,str);
        getditem( dial_ptr,item,ty,item_hndl,box );
        setitext( item_hndl,str );
    end;

procedure setDreal( dial_ptr: dialogptr; item: integer; value: extended );
        { places the real value (to 5 decimal places) into the dialog with handle dial_ptr at item item (as text) }
    var str: str255;
        box: rect;
        item_hndl: handle;
        ty: integer;
    begin
        real2str(value,5,str);
        trimreal(str);
        getditem( dial_ptr,item,ty,item_hndl,box );
        setitext( item_hndl,str );
    end;

procedure getDtext( dial_ptr: dialogptr; item: integer; var str: str255 );
        { returns str as the text string from item item in the dialog with handle dial_ptr }
    var box: rect;
        item_hndl: handle;
        ty: integer;
    begin
        getditem( dial_ptr,item,ty,item_hndl,box );
        getitext( item_hndl,str );
    end;

function getDinteger( dial_ptr: dialogptr; item: integer; var result: integer ): boolean;
        { returns true if the text string in item number item in the dialog with handle  dial_ptr is a correctly
        { formed integer, and result as its value; or else returns false if the string is not a good integer. }
    var str: str255;
        box: rect;
        item_hndl: handle;
        ty: integer;
    begin
        getDinteger := false;
        getditem( dial_ptr,item,ty,item_hndl,box );
        getitext( item_hndl,str );
        if valid_int(str) then
            begin
                str2int(str,result);
                getDinteger := true
            end
        end;

function getDreal( dial_ptr: dialogptr; item: integer; var result: extended ): boolean;
        { returns true if the text string in item number item in the dialog with handle dial_ptr is a correctly formed
        { real, and result as its value; or else returns  false if the string is not a good real. }
    var str: str255;
        box: rect;
        item_hndl: handle;
        ty: integer;
    begin
        getDreal := false;
```

```
        getditem( dial_ptr,item,ty,item_hndl,box );
        getitext( item_hndl,str );
        if valid_real(str) then
            begin
                str2real(str,result);
                getDreal := true
            end
    end;

procedure setDHilite( dial_ptr: dialogptr; item: integer; value: integer );
        { sets the hilite value of item number item in the dialog with dialog handle dial_ptr to value }
    var box: rect;
        item_hndl: handle;
        ty: integer;
        cntrl_hndl: controlhandle;
    begin
        getditem( dial_ptr,item,ty,item_hndl,box );
        cntrl_hndl := pointer(item_hndl);
        hilitecontrol(cntrl_hndl,value)
    end;

IIIIIIIIprocedure setDCtlValue( dial_ptr: dialogptr; item: integer; value: integer );
        { sets the control value of item number item in the dialog with dialog handle dial_ptr to value }
    var box: rect;
        item_hndl: handle;
        ty: integer;
        cntrl_hndl: controlhandle;
    begin
        getditem( dial_ptr,item,ty,item_hndl,box );
        cntrl_hndl := pointer(item_hndl);
        SetCtlValue(cntrl_hndl,value);
    end;

function getDCtlValue( dial_ptr: dialogptr; item: integer): integer;
        { returns the control value of item number item in the dialog with dialog handle dial_ptr }
    var box: rect;
        item_hndl: handle;
        ty: integer;
        cntrl_hndl: controlhandle;
    begin
        getditem( dial_ptr,item,ty,item_hndl,box );
        cntrl_hndl := pointer(item_hndl);
        getDCtlValue := GetCtlValue(cntrl_hndl)
    end;
```

◊◊

The following pages contain some of the software that has been developed (or is being developed) at various colleges and universities. Feel free to call the developer(s) directly for additional information. When this becomes burdensome, we will institute a different procedure for obtaining information from developers. Software may, or may not, be free. It may come with, or without, documentation. It may be good or it may be bad (or it may be insanely great). If you know of any projects that are going on at your school, please send them along for inclusion in our next issue. Send all material to **Wheels for the Mind**, Boston College-Fulton 430, Chestnut Hill, MA 02167.

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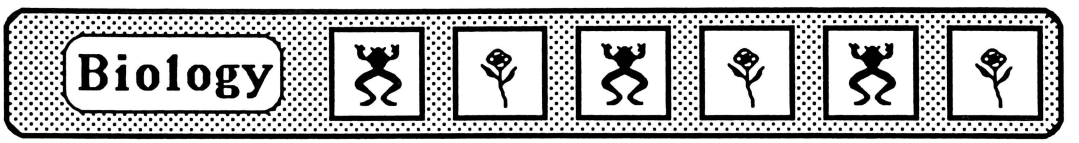
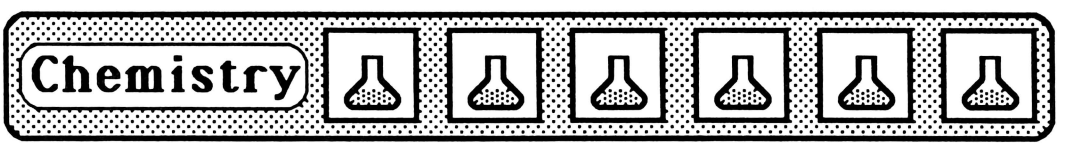
Notes: Nearly all of the courseware developed at Dartmouth will be freely available to any educational institution at cost of distribution only. This includes non-copy-protected programs and documentation. The Personal Computing Center at Dartmouth is making available a printed catalog of courseware with descriptions of the programs we offer. The contact for **all** Dartmouth courseware has been changed to the Personal Computing Center, 1 McNutt Hall, Dartmouth College, Hanover, NH 03755; (603) 646-3249.

The projects that were described in Issue #1 of WHEELS FOR THE MIND are printed in smaller type in this current issue. (Descriptions older than 1 issue will be shortened considerably.) Please scan through all of the projects since some changes (they will be in normal size type) have occurred. Thank you.



Project: Plant Identification Program
Contact: Albert List, Department of Biology, Drexel University; (215) 895-2626
A plant identification program to enable students to identify any one of 90 different shrubs and trees in the local environment. Current status: Completed

Project: Genetics: Understanding Cellular Processes
Contact: Michael A. Gealt, Department of Biology, Drexel University; (215) 895-2637
A program for genetics which will allow for: I) improved understanding of dynamic cellular processes by using demonstration programs with pseudo-animation, and 2) individual student specialization in areas such as population genetics and molecular genetics, for which there is inadequate time in the more traditionally based teaching courseware. Current status: To be completed by June 1986.



Project: Tutorial Lessons

Contact: Sally Solomon, Department of Chemistry, Drexel University; (215) 895-2642 or (215) 735-4530

LessonWriter allows an instructor to create highly interactive tutorial lessons by writing MacWrite-style documents. Each question in a lesson can be accompanied by specific messages for as many as 30 student responses. Special options allow the instructor to omit spaces, ignore case, and look for partial matches in student inputs. The lesson designer may also introduce hints and direct branching based upon a specified number of student attempts. Some chemistry lessons are available. Current status: Early version completed.

Project: General Chemistry

Contact: Allan Smith, Department of Chemistry, Drexel University; (215) 895-2667

Two Multiplan spreadsheets have been designed for use in General Chemistry. EquilCalc provides a tool for solving for equilibrium concentrations in the general reaction aA+bB=rA+sS, given initial concentrations and the equilibrium constant. AcidBaseTitr generates a plot (within Multiplan) of pH vs added base for the titration of a weak acid with a strong base; no approximations as to the magnitude of Ka or [H+] are made in deriving the equation used in AcidBaseTitr. Current status: Completed.

Project: Orbital Mixing
Contact: Personal Computing Center, 1 McNutt Hall, Dartmouth College, Hanover, NH 03755; (603) 646-3249.
Orbital Mixing depicts the molecular orbitals derived from the 1p orbitals overlapping the PI manner. All orbitals are viewed perpendicular to the 2P nodal plane. The radii of the circles shown are proportional to the atomic orbital coefficients and the areas of the circles are thus proportional to electron density. Current Status: Orbital Mixing is finished, and is now being used in intermediate level chemistry courses.

Project: Organic Nomenclature Tutorial
Contact: Sally Solomon, Department of Chemistry, Drexel University; (215) 895-2655 or (215) 735-4530
A highly interactive organic nomenclature tutorial. Like similar programs of this type, molecules are displayed on the screen and students are asked to type in answers. Unlike other nomenclature tutorials, as many as 20 or more possible student responses have been anticipated for each molecule. A specific reply is displayed for each of these responses. Students may "try again" as long as they like or may "get help." Current status: To be completed by December 1984.

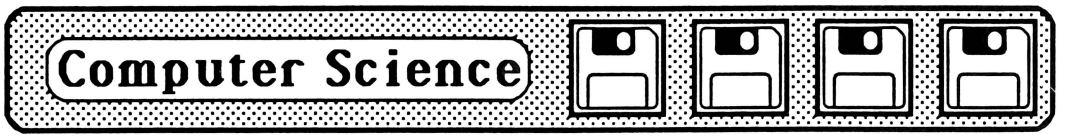
Project: Acid Base Titration Curves
Contact: Anthony Addison, Department of Chemistry, Drexel University; (215) 895-2646
A program to enable students to simulate acid-base titration curves in aqueous solution. Weak or strong acid/base, titration by any volume of acid or base. Current status: To be completed by February 1985.

Project: Literature Retrieval Database
Contact: Anthony Addison, Department of Chemistry, Drexel University; (215) 895-2646
Literature retrieval database. Storage of references, report generation by database searching. Current status: To be completed by January 1985.

Project: Molecular Model Construction Kit
Contact: Allan Smith, Department of Chemistry, Drexel University; (215) 895-2667
A software-based molecular model construction kit. Students will be able to build a molecule one atom at a time with correct band lengths and angles provided by the program. They will be able to rotate a three-dimensional ball and stick representation around any axis, store and retrieve structures as files, and compare two structures in different windows. Current status: To be completed by December 1984.

Project: Atoms and Elements Knowldege Base
Contact: J. P. Friend, Department of Chemistry, Drexel University; (215) 895-2666
Peri-Chart: An electronic knowledge base on atoms and elements that uses the periodic chart as a control structure for organizing data and properties of the elements. User can obtain data organized in various fashions. Tabulation and plotting capabilities are features. User can learn by exploring. Current status: To be completed by Winter 1985.

Project: Chemical Reaction Simulation
Contact: Frank D. Blum, Department of Chemistry, Drexel University; (215) 895-2650
This program simulates chemical reactions that occur in the polymerization process. It is specifically designed to show the difference graphically between step and chain growth polymerizations. Current status: To be completed by January 1985.



Project: RASCAL™

Contact: Prof. Richard Crandall, Reed College, Portland, OR 97202

Rascal (Real-time Pascal) is a new computer language designed specifically for use with the Apple Macintosh. It is a complete development system: a single application contains an editor, compiler, linker, and executor. You can produce programs (compiled to the Macintosh native language-68000 code) and run them, without ever switching applications. Rascal source code is very similar to Pascal, with some elements of C

added for good measure. A special program structure allows you to create multitasking objects. With Rascal's tiny supervisor structure, you can run several different programs at the same time, each program having its own window.

The language provides you with built-in serial port routines, total access to the Macintosh Toolbox Routines, and some specially written, built-in graphics routines. Any executable Rascal object code can be turned into a stand-alone application.
Current status: Projected completion time is sometime this spring. Alpha testers are still being sought. If you are interested, contact Richard Crandall or Scott Gillespie at Reed College (503) 771-1112, 277.

Project: Assembler/Editor/Loader

Contact: MacLab, Reed College, 3203 SE Woodstock Boulevard, Portland, OR 97202; (503) 771-1112, 277. Finished products are distributed by Metaresearch, Inc., 1100 SE Woodward, Portland, OR 97202; (503) 232-1712.

This application was designed to allow efficient programming of Intel 8051/8031/8751 microcontrollers. Using the Macintosh window environment, this package provides instant visual access to all steps of program development: (1) edit the source code in the Edit window, (2) assemble the source code into hex opcode, which is then visible in the Assembler Listing Window, and (3) download the object code and use the Monitor Window to send commands that execute the code. It is ideal for programming serially networked MCS-51-based devices or for high-speed data collection and appliance control via external lab computers. Current status: Completed. Consortium price: $150. Retail price: $250.

Project: ADA Language
Contact: Carl Schmiedekamp, Dept. of Mathematics and Computer Science, Drexel University; (215) 895-2681
We plan to port a compiler for a subset of the ADA language from the IBM PC to the Macintosh. We have been delayed due to negotiations for a license for the source code. As a warm-up exercise we have been implementing a Fig Forth interpreter on the Macintosh. Current status: To be completed by winter 1985.

Project: MACFORTH Experiences
Contact: Robert C. Busby, Department of Mathematics and Computer Science, Drexel University; (215) 895-1957
MacFORTH™ (from Creative Solutions) was used as a development system to see if complete applications, including windows and menus, could be developed using only the Macintosh. This was found to be feasible, and inherently much easier than using the Lisa-Macintosh cross-development system. The latter requires a Lisa. The FORTH system allows the development of interactive graphictechniques for "automating" the construction of windows, menus, and icons .. something not now possible on the Pascal system. Current status: Completed.

Project: Friendly FORTH
Contact: Robert C. Busby, Department of Mathematics and Computer Science, Drexel University; (215) 895-1957
Attempts are being made to create a "friendly" development system in MacFORTH that would be accessable to a much larger portion of the faculty than the present system. The possibility of developing a Drexel FORTH System is being explored. Several contacts and some progress toward that end have been made. Current status: NA.

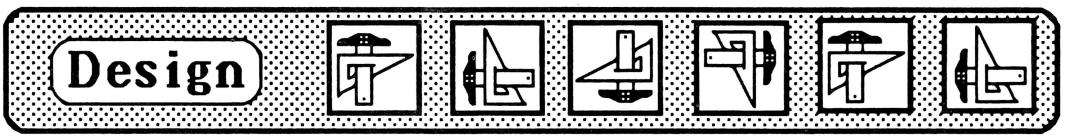
Project: Bibliographic database (ethical/legal)
Contact: Diana Woodward or Michael Najarian, College of Information Sciences, Drexel University; (215) 895-2491/2474.
A bibliographic database that contains references to books and articles on ethical/legal issues of information distribution. Topics include censorship, freedom of information versus privacy, copyright, impact of the "information revolution" on economics, education, politics, and other fields. The prototype is being created on SCIMATE for the IBM PC. When SCIMATE is available for the Macintosh, the bibliography will be converted to it. Current status: Completed.

Project: Pascal Tutorial
Contact: Jeffrey L. Popyack, Department of Mathematics, Drexel University; (215) 895-2668/1959
A tutorial-type package for teaching the use of dynamic variables and pointers in Pascal. The user is able to type in commands from a suitable subset of Pascal. These commands are interpreted and the resulting data structure is displayed (and updated) graphically on the screen. Current status: Completed

Project: UNIX Based C Development System
Contact: Ed Pattermann/Bill Croft, SUMEX-AIM , Stanford University; (415) 497-2300
SUMacC is the Stanford/UNIX Macintosh C development environment, a collection of programs that allows you to cross-develop Macintosh applications on your UNIX™ system and then download them to the Macintosh for execution. Included with the package are Macintosh library/header/lint files, UNIX commands (such as rmaker, macget/put, mac-to-laserprinter), examples, and documentation. Source files are provided. Many users have contributed much to the enhancement of this development system. Copies are obtainable in a variety of ways (such as ARPANET and US MAIL) . Contact Bill Croft for additional details. Current Status: Completed and continuing.

Project: Using Pascal In Introductory Programming
Contact: Assistant Chairman, Undergraduate Education, Stanford University; (415) 497-2300
The Department has already added a Macintosh section to its CS1 "Using Computers" course. Current Status: Ongoing.

Project: Using the Macintosh in a First Computer Course
Contact: Peter Olivieri/James Gips, Computer Sciences, Boston College; (617) 552-3975
The Macintosh has been successfully used as the primary learning tool in a first computer course for about 400 students. Course materials include examples in Multiplan, Microsoft Chart, Microsoft BASIC, Filevision, MacWrite and MacPaint. Current Status: Completed and continuing.



Project: Database on History of Modern Design
Contact: Grant Greapentrog, Department of Design, Drexel University; (215) 895-2392
This is a database, using LisaList, for a course on the history of modern design. Includes mass-produced objects such as furniture, lighting, tableware, industrial design, and appliances, with approximately thirty descriptors for each item. Conversion to the Macintosh will take place as soon as an appropriate database management program (probably Helix) is available . Current status: NA.

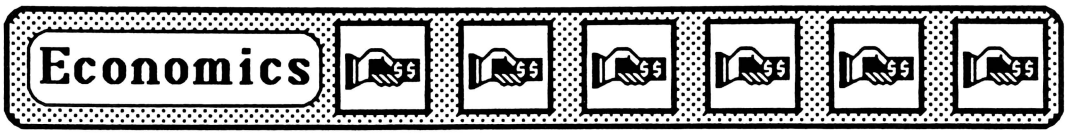
Project: Interior Design Tool
Contact: William Kriebel, Department of Design, Drexel University; (215) 895-2392
This software-based, interior design tool for the Macintosh uses space-planning program analysis via affinity diagrams (work/personnel relationship matrices) as an aid in creative design/drawing board work. Current status: To be completed in summer 1985.

Project: Fashion Design Aid
Contact: Rene Weiss Chase, Department of Design, Drexel University; (215) 895-2392
Development of 1/4 scale slopers in a full range of women's sizes to aid fashion design students with pattern making and pattern manipulation. Current status: To be completed by August 1985.

Project: Basic Design Principles
Contact: Dennis Will, Department of Design, Drexel University; (215) 895-2392
Exploration of appropriate applications of MacPaint to the two dimensional freshmen design courses by examining the relationship between two dimensional basic design principles and the computer. Current status: Completed.

Project: Design Tools
Contact: Karin Sunstedt, Department of Design, Drexel University; (215) 895-2392
A "sources" database for use in interior design. Items include furniture, textiles, flooring, and building materials. Future plans include interface with interactive video systems. Current status: To be completed by fall 1985.

Project: Office Space Planning
Contact: Karin Sunstedt, Department of Design, Drexel University
A workstation utilization of MacDraw for space planning in office design. Current status: To be completed by fall 1985.



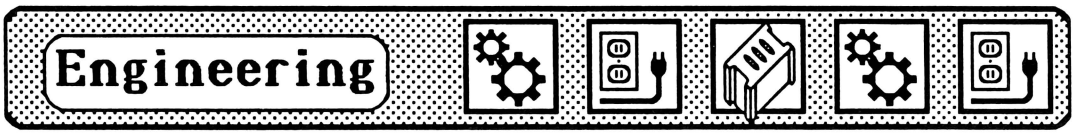
Project: Economics Review

Contact: Chiou-shuang Van, Department of Economics, Drexel University; (215) 895-2146

This project includes five interactive review units for Economics I covering various aspects of demand and supply analysis. Different problems are generated via a random number generator. Provides for on-the-spot mistake correction. Written in Pascal.
Current status: NA.

Project: Multiplan Templates
Contact: Chiou-shuang Yan, Department of Economics, Drexel University; (215) 895-2146
Twenty homework problems for Economics I and II micro and macro have been developed. They cover topics ranging from supply and demand to international trade. Current status: Completed.

Project: Multiplan and Graphics
Contact: Edward Koziara, Department of Economics, Drexel UNiversity; (215) 895-2125
Thirty classroom demonstrations for Economics I and II have been developed. Topics range from profit maximization to international trade. Current status: Completed.



Project: Fourier Analysis

Contact: Banu Onaral, Department of Electrical and Computer Engineering, Drexel University; (215) 895-2247

A Fourier Analysis module is being prepared as a continuation of the Signal Operations module for undergraduate courses in systems engineering. It follows the same user-interaction format and screen-design philosophy of the "Signal Operations" module. It performs discrete Fourier Transform of signals using Fast Fourier Transform (FFT) algorithm, and allows a variety of signal operations both in the time and the frequency domains. Signal windowing capability is provided, including a number of commonly used-windows as well as user-defined windows. The program is designed as an interactive analyzer to test and reinforce transform concepts with minimal tutorial function.
Current status: First testing: spring 1985; Second testing: summer 1985.

Project: Multiplan Templates

Contact: Prof. Henry Riggs, Stanford University; (415) 497-2300

This application consists of a series of financial models used with Multiplan for an engineering course on industrial accounting. Current status: Completed.

Project: Nutritional Composition Problems

Contact: Stephen Dubin Department of Biomedical Engineering Drexel University; (215) 895-2392

Newdiet and Prodiet are Multiplan programs for solving nutritional composition problems involving linearly additive dietary elements as well as computation of the chemical score - an index of relative protein quality. In the "protected" version, the nutritional data for twenty foods is stored. A workbook explaining the underlying computations is available for these programs. Current status: Completed.

Project: Engineering Economics

Contact: Dr. Sandor Popovics, Department of Civil Engineering, Drexel University; (215) 895-2345

Multiplan applications in solving various problems in engineering economics are being developed. They address problems related to compound amount, present worth, sinking fund, series compound amount, capital recovery, series present worth, gradient uniform series, and gradient present worth. Current status: Completed.

Project: Geotechnical Engineering Analysis

Contact: Robert M. Koerner, Department of Civil Engineering, Drexel University; (215) 895-2343

This project includes geotechnical engineering analysis programs (consolidation settlements, slope stability, pile analysis, and others) and related graphics. Current status: To be completed by March 1985.

Project: Mineral Analysis

Contact: Edward Doheny / Kerry Petrasic, Department of Civil Engineering, Drexel University; (215) 895-2344

This Pascal program assists students in identifying minerals. The minerals chosen are the 30 most common minerals found in rocks, soils, and important ore deposits. Procedure involves laboratory determination (by the student) of several basic physical properties, such as luster, cleavage, crystal symmetry, hardness, streak or color, and acid reaction. The properties are then entered into the program and the computer suggests the most likely mineral or minerals that exhibit the properties described. Current status: Completed.

Project: Structural Mechanics

Contact: Ahmad A. Hamid, Department of Civil Engineering, Drexel University; (215) 895-2342

Dialogue programs for structural analysis to help students strengthen their background in basic principles of structural mechanics, including stability, determinacy and equilibrium. The programs are interactive in nature with graphics to display the type of structure, geometry, and loading. Current status: Preliminary version completed. Final by June 1985.

Project: Structural Response to Loading

Contact: Ahmad A. Hamid Department of Civil Engineering, Drexel University; (215) 895-2342

Interactive programs to determine structural response to loading. For a given structure the student is asked to determine maximum internal forces (shear forces and moments) and maximum deflection for a particular loading. This type of program can be used to conduct parametric studies of the affect of different parameters on structural response. Current status: Preliminary version completed. Final by June 1985.

Project: Chemical Engineering Process Principles

Contact: John Tallmadge, Department of Chemical Engineering, Drexel University; (215) 895-2228

This is a software tutorial to review the elementary process principles in flowing processes, by examples suitable for freshmen. Two such examples are mass balances in flowing separators and heat transfer in two stream heat exchangers. Current status: To be completed by April 1985.

Project: Sulfuric Acid Manufacture

Contact: John Tallmadge, Department of Chemical Engineering, Drexel University; (215) 895-2228

A software tutorial to review principles in this three-reaction step process (using examples suitable for freshmen). The reaction steps in the contact process are the simple burner for dioxide, the complex multi-staged catalytic bed for tioxide, and the unusual absorber reactors for acid and oleum. Current status: To be completed by April 1985.

Project: Digital Logic Circuits

Contact: William Freedman, Dept. of Electrical and Computer Engineering, Drexel University; (215) 895-1913

A computer-aided instruction package for an introduction to digital logic circuits. The programs are set up to be problem oriented with response-dependent theory review. Current status: To be completed by June 1985.

Project: Signal Operation

Contact: Banu Onaral, Department of Electrial and Computer Engineering, Drexel University; (215) 895-2247

A Signal Operations module for use in introductory systems engineering courses. Intended as a visualization tool for signal and system processing, it offers a variety of signal-generation options ranging from singularity functions, sinusoids, and exponentials to arbitrary functions. It also provides signal editing capability. Signal operations include time and amplitude scaling, time shifts and flips, addition/subtraction, multiplication/division, difference, summation and convolution. Except for minimal "help" capability, the module has no tutorial function. It is designed as an interactive exerciser which carries out lengthy and routine computations and displays the results in graphical and/or numerical form. Current status: First and second versions tested.

Project: Basic Electric Circuits

Contact: E. L. Gerber, Department of Electrical, Drexel University; (215) 895-2255

Tutorial material in basic electric circuits is being developed. Format: in topics and sub-topics selected by Menu. Self-paced branching programmed tutorials are used with several simple text screens followed by examples, followed by problems with responses. Current status: Continuing topic by topic.

Project: Materials Engineering

Contact: Witold Brostow, Department of Materials Engineering, Drexel University; (215) 895-2382

Implementation of TK!Solver for problems in materials engineering, such as rapid crack propagation in plastic pipes, prediction of phase diagrams, determination of purity of materials, polymer flow and processing, and impact behavior of materials. Current status: NA.

Project: Computer-Aided Design

Contact: Gordon Moskowitz/ Donald H. Thomas, Department of Mechanical Engineering, Drexel University; (215) 895-2210/2264

Computer-aided learning packages for STATICS. Also, a computer-aided design engineering (CADE) approach which uses a Smart Sketch pad to enable the engineer (student) to use the Macintosh in the same way he would use pencil and paper in a design solution. Current status: To be completed by spring 1985.

Project: Mechanics

Contact: Murdock/Robbins, Dept. of Mechanical Engineering and Mechanics, Drexel University; (215) 895-2299/2298

Use of the Macintosh to produce orthographic, isometric, oblique, and section drawings; plots of graphs; and equation analysis of curves. The use of Macintosh Pascal is being explored for producing a piping drawing. Current status: To be completed by March 1985.

Project: Linear Algebra

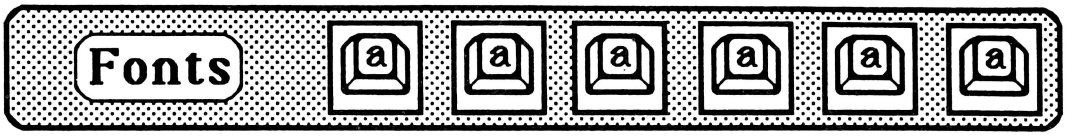
Contact: Drs. Bahar and Kwatny, Deptartment of Mechanical Engineering and Mechanics, Drexel University; (215) 895-2290/2356

An interactive, menu-driven software package, using MacPascal, for linear algebra. Students will be able to use this as an aid in solving problems where matrix manipulations are involved. The following routines to be made into interactive packages with illustrative examples are being currently developed: I) finding roots of a set of non-linear equations using the Newton-Raphson method; 2) ordinary differential equation solver along with some graphic routines in order to animate time response of dynamical systems; 3) finite element techniques. Current status: To be completed by Spring 1985.

Project: Thermal-fluid Instructional Software

Contact: Baktier Farouk, Department of Mechanical Engineering and Mechanics, Drexel University; (215) 895-2287

Thermal-fluid instructional software has been developed (on a VAX 11/750 computer using FORTRAN). This has been done with a view to implement the microcomputer as a useful tool in the instruction of basic heat-transfer and fluid-mechanics courses at the undergraduate level in the Mechanical Engineering and Mechanics department. The programs are interactive and allow students to perform parametric studies of the topics discussed in class. Current status: To be completed by April 1985.



Project: Font Development

Contact: Michael J. Connolly, Slavic and Eastern Languages, Boston College-
Carney 236, Chestnut Hill MA 02167; (617) 552-3912

All fonts in our project are carefully designed and have been mapped to a "native" keyboard layout. Current status: The following projects are available now:

- **Pskov 10** (Geneva/Seattle Cyrillic, v2.3, including OCS and South Slavic)
- **Vladimir 12** (Chicago Cyrillic, v1.8 Russian only)
- **Eznik 10** (Geneva/Seattle Armenian)
- **Mesrob 12** (Chicago Armenian)
- **Tech** 9/10/12/18/20/24 (special **Roman/Greek/Econometrics** font, developed by D. Belsley)
- **Lunt** 10/12 (hybrid Pskov on 10, Vladimir on 12, both mapped to a QWERTY keyboard layout by L.G. Jones; useful for secretaries but not supported or compatible with real Pskov/Vladimir documents)

The following projects are forthcoming; they are currently being tested:

- **double-scale versions** of Pskov, Vladimir, Eznik, Mesrob
- **Phonetica** 9/12/18/24 (Geneva-based)
- **LaserWriter fonts** for Cyrillic (Ohrid), Armenian (Koriwn), and phonetics (Sweet)

The following projects are being developed:

Georgian, LinearB, Amharic, Coptic, Insular (Old Irish, Old English, Latin), and others.

Distribution:

One copy made free of charge for requesters who provide:

- self-addressed, stamped return envelope/mailer
- covering letter/note with address
- two blank, new, best-quality Macintosh disks
- two sets of blank disk labels and slip covers.

We return one diskette with fonts and documentation (MSWord) The second disk is our token commission. We will release only finished and tested products, but also welcome exchanges of fonts or ideas with other developers. For "upgrades," consult this publication or Boston College's Macintosh Faculty Development Lab, Gasson Hall 12.

Project: Colophon Greek, Polish Fonts

Contact : Marc Cogan, Associate Professor/Acting Chairperson, Dept. of Humanities, Wayne State University, 5925 Woodward Avenue, Detroit, MI 48202

Two sets of foreign language fonts are currently available at Wayne State. The first is a set of fully accented Greek characters (in 10-, 12-, and 18-point sizes) called "Colophon," which, by virtue of its inclusion of the complete accent set is among the more advanced versions available. The second is a set of adaptations of the full range of sizes of Geneva, New York, and Toronto with the addition of the special characters (called, respectively, "Warszawa," "Krakow," "and Gdansk") needed for Polish word processing added. Documentation is available.

Current Status: These fonts are completed and are available to anyone requesting a copy. Please send along a disk.

Project: A Font Workshop

Contact: Walter Knapp, 905 NE 114th, Seattle, WA 98125

The Font Workshop, a disk prepared for the University of Washington, tries to clear up much of the confusion about using the Font Editor, Font Mover, and related tools. Much of the information on the disk was learned by trial and error. This disk tries to centralize the more than dozen technical notes on how to use these utilities. If you would like a free copy, send a disk to the above address.

Current Status: Completed.

Project: Signifier

Contact: Norm Meyrowitz or Bernard Haan, Institute for Research in Information and Scholarship(IRIS), Brown University

Signifier is a set of software tools that will enable Macintosh users to create and edit text in non-Roman writing systems such as Greek, Coptic, Cyrillic, and Hebrew. IRIS and six departments (Anthropology, Classics, Comparative Literature, German, Religious Studies, amd Slavic Languages) expect to complete the project in successive stages during the next one to two years. The first phase, which includes Greek and Neo-Cyrillic fonts, a font for phonetic transcription, and a facility for automatic transliteration, is completed.

In phase two, a sophisticated font editor will be introduced that allows users to create their own character sets--even calligraphic and cursive-style characters such as those in Devanagari and Arabic.

Current status: Test versions will be available in September 1985.

Completed Fonts

OPHIR FONT	University of Utah, Prof. Tapscott (801) 581-8814. This is a font for formal logic.
VENICE 28	University of Utah, Tony Jacobs (801) 581-6499.
CHINESE BEIJING 14	University of Utah, Joel McNamara (801) 581-8663.
MATH and GREEK	Princeton.
EXTENDED GREEK	Rice.
MATHEMATICS	Rice.

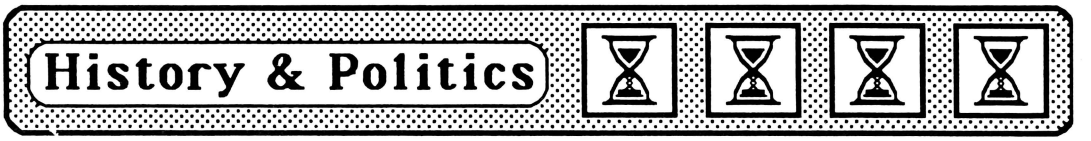
BAUHAUS	University of Notre Dame.
GENOA	University of Notre Dame.
NEW MATH	University of Notre Dame.
HEBREW 12	University of Notre Dame.
OLD GAELIC	University of Notre Dame.

Current status: All these fonts are completed and may be available from the technical representative of each particular university. (Refer to Technical Contact phone numbers elsewhere in this publication.)

Project: Devanagari Script

Contact: Stephen Dubin, Department of Biomedical Engineering, Drexel University; (215) 895-2392

MacScripture is a program for creating Devanagari. The Devanagari script is used for the ancient Sanskrit scriptures as well as for modern Hindi. In addition to having a set of letters different from English (55 consonants and vowels), the Devanagari script has two additional interesting features. The vowel symbols must be "overstruck"; that is, added to the consonant symbols. As there are thirteen vowels, it is impractical to have the 546 distinct symbols that would be needed. Each simple letter has the short "a" or "uh" vowel implicit in it. When this is not desired, the complex conjugate forms result. A total of 3025 symbols would be needed to represent these combinations. This program permits the overstriking of letters, and uses the "shift" of each letter to form the combining form of the letter in the formation of complex conjugates. Current status: Completed.



Project: Measuring World Order Values

Contact: Michael J. Sullivan III, Department of History and Politics, Drexel University; (215) 895-2465

This project involves the development of a database for measuring five world order values: (1) peace, (2) economic well-being, (3) ecological quality, (4) social justice, and (5) political participation. Each value is measured by as many as 50 global indicators. The framework is applied to all 160 states in the international community.
Current Status: Expected to be completed in the fall of 1985.

Project: Non-Specialized English Vocabulary

Contact: Stanley Wasson, Department of History and Politics, Drexel University; (215) 895-2464

A vocabulary drill based on three hundred words of the nonspecialized English vocabulary used in McKay,*et al., A History of Western Society*, Chapters 16-25. Students complete ten matching exercises aided by "clues" consisting of each word's use in context. The goals of the drill are to enlarge the student's vocabulary, make the student more aware of the words he reads, and heighten the student's sensitivity to shades of meaning. Current status: Completed.

Project: Treaty of Versailles

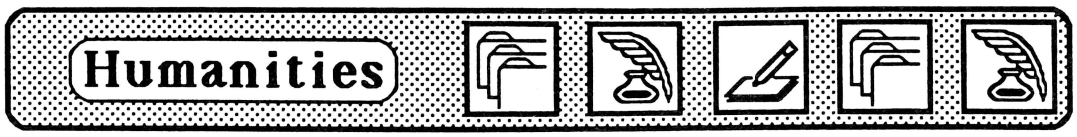
Contact: Eric Dorn Brose, Department of History and Politics, Drexel University; (215) 895-2471

A series of exercises to teach the major territorial and reparation decisions in the Treaty of Versailles. Uses questioning and interactive map exercises. Current status: Completed.

Project: Historical Simulation

Contact: Prof. Carolyn Lougee, Stanford University; (415) 497-2300

The project involves the development of a historical simulation that places the student in the role of a young man of modest means who reaches his majority in the first year of the reign of Louis XIV. The task is to accumulate wealth and prestige through wily investment, marriage, and political maneuvering, and pass that value on, first to a son and then to a grandson. Current status: Used during the winter quarter.



Project: Literary Works

Contact: Ray Brebach, Department of Humanities and Communications, Drexel University; (215) 895-2437

A set of questions arranged in a branching format to aid students in developing and organizing their ideas about literary works. For example, a student will be given one set of questions about a character identified as a "foil","another for a "protagonist," and another for an "antagonist." Help boxes containing definitions of critical terms and ideas to explore in answering questions will be available to students. Current status: To be completed by fall 1985.

Project: Visual Process Thinking

Contact: Bernard Brenner, Department of Humanities, Drexel University; (215) 895-1822

A series of excercises, generated through MacPaint, designed to enhance fluency with and awareness of the creative act required to use visual process thinking. Learning occurs through the actual making of visual images in response to questions posed by the exercises. Current status: Completed.

Project: Analysis of Non-fiction Articles

Contact: Vivian Rosenberg, Department of Humanities and Communications, Drexel University; (215) 895-2445

A prewriting exercise for the analysis of nonfiction articles and essays. Current status: Completed.

Project: Database Concepts

Contact: Harold Kollmeir, Department of Humanities and Communications, Drexel University; (215) 895-2448

Software that simulates the search environment of BRS, a commercial database vendor, used to introduce freshmen to database concepts and search strategies. Current status: Completed.

Project: Term Papers, Organizing Principles

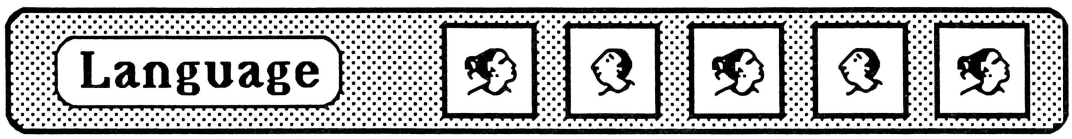
Contact: Eva Thury, Deparment of Humanities and Communications, Drexel University; (215) 895-1960

The Matrix Organizer is a software program that assists students in writing term papers. This software will enable students to write index cards on the screen and to arrange them by "shuffling" and "dealing" the cards into a grid-shaped structure that will serve as the organizing principle of the paper. Current status: NA.

Project: PreWriting Program

Contact: Valerie Arms, Department of Humanities, Drexel University

A prewriting program designed to stimulate ideas about the direction a document should take to achieve its purpose. It is useful after the student has chosen a topic but has not yet narrowed its focus. The program helps the student to shape the ideas on the topic with a specific reader in mind. It works by asking a series of questions about audience and purpose, and generates a printout of the responses. It ends with a suggestion that the student start freewriting. Current status: Completed.



Project: HYPERTEXT/HYPERMEDIA

Contact: Norm Meyrowitz, IRIS Scholar's Workstation Group Manager, Brown University. Computer Science Department Chairman Andries van Dam acts as a consultant to the project, and Nicole Yankelovich, IRIS Project Coordinator, is the primary liaison with the Brown faculty.

The Institute for Research in Information and Scholarship has undertaken a long-term research project to design and develop a hypertext/hypermedia system. The research is

being conducted within the context of Brown's Scholar's Workstation Project---a decade-long effort directed at creating a campus-wide network of high-powered, graphics-based workstations for use in research and teaching in the sciences and liberal arts.

Hypertext is both an author's tool and a reader's medium. With hypertext, authors or groups of authors will be able to link information together, annotate existing texts, and create footnotes that allow readers to see either bibliographic data or the body of the referenced text. Readers will be able to browse through linked, cross-referenced, annotated, footnoted texts in an orderly, but nonsequential manner: an automated encyclopedia of sorts. To learn about Greece from an encyclopedia, for example, students must look up the topic and then retrieve volume after volume to find the host of other articles related to Greece (Acropolis, Plato, Crete, and the like). With a hypertext system, however, students could easily browse through the suggested articles by touching the words.

Using hypertext on a network of computer workstations, students could electronically "hand in" written assignments that include "links" to reference material. The professor (and other students, if permitted), could read the document, examine the reference material, and add personal annotation links -- such as comments, criticisms, and suggestions, for revision -- to the student's document. These annotations might introduce links to different reference material, perhaps to emphasize a counter-argument to a point the student has made. While revising the document, the student could see all the professor's comments and examine the sources containing counter-arguments.

Hypermedia is an extension of hypertext that includes such components as pictures, video, voice, and animated computer graphics. With a hypermedia system, an author will be able to create links to complex diagrams, texts, photographs, video documentaries, symphonies, and the like. For example, a music instructor teaching a course on Bach might prepare a hypermedia corpus for the class that could include a biography of the composer's life with links to the score of each musical work mentioned, a documentary film about Bach's life, and other scholarly texts about his work. In turn, each score might include a link to one or more recordings of the piece.

Over the next three years, researchers at IRIS hope to complete a hypertext/hypermedia system that will run on a stand-alone advanced workstation. Once a working prototype is developed, they will extend the system to function over a network, making joint authorship, file transfer, and remote storage of large databases feasible. In addition to the uses described above, the hypertext/hypermedia system is being designed to provide a framework for educational software development. With funds from the Annenberg/CPB Project, IRIS plans to test this framework in three experimental courses over the next three years.

Current status: A long term, on-going project. An initial hypertext/hypermedia prototype allows users to create links to interactive videodisk frames as well as text.

Project: The Glossarizer

Contact: Katy McKinnon, University of Notre Dame

This 6K-long application was conceived as a tool for building "side by side" glossary entries for foreign language texts. The tool is general enough to use for just about any text that requires a set of dynamic notes. As the application becomes more "robust," an Indexer would allow users of an application like MacWrite to scroll through a MacWrite

document and, by double-clicking at the appropriate places in the text, bring up a window which asks for the desired index entry (or entries). The application would then automatically construct and print an alphabetized index for said text.
Current status: The Glossarizer is now working. Modifications and enhancements are in process.

Project: GriffinText™

Contact: Metaresearch, Inc., 1100 SE Woodward, Portland, OR 97202; (503) 232-1712

GriffinText was developed at the Reed College MacLab. It is a fast, no frills text processor designed specifically for academic users. Because of its simplicity and dedication to straight ASCII text, GriffinText can display, process, and print very quickly, and can easily handle large text files (up to 32K). In addition, to eliminate the problems associated with breaking a large document into several files, GriffinText has a "chainprinting" procedure that allows you to merge files into one document with continuous page numbers and with no blank spaces between files. The idea behind GriffinText is to make the process of creating and revising text as efficient as possible, while embellishments are reserved for short documents and final versions.
Current status: Completed and available. Consortium price: $39. Retail price: $69.

Project: Drill, an English-Language Drill Program

Contact: The Personal Computing Center, 1 McNutt Hall, Dartmouth College, Hanover, NH 03755; (603) 646-3249

Drill handles English-language drills. The instructor writes drill script in MacWrite, and as many additional aid files as desired. Examples of the latter might be grammar tutorials, dictionaries, or thesauris. S/he then gives those files to the student, with a copy of Drill. When Drill is run and the student selects a new drill, he is given instructions and questions in a window of text, and he types in answers there. At any time he may bring out any of the aid windows, and scroll through those and the drill window to find what he needs. He may also end a drill session, or move to the next section within the drill.

This program will soon be extended to handle Greek fonts, and then later to other languages and pictures (see the description for the language project). Current Status: This application has been used in fall and spring courses.

Project: A Language Teaching Program

Contact: The Personal Computing Center, 1 McNutt Hall, Dartmouth College, Hanover, NH 03755 (603) 646-3249

This program, an extension of the Drill program, adds these capabilities:

- Foreign language, using Macintosh fonts: Greek, Spanish, and German initially, others later. This would extend over all of the features of the current Drill program.
- Graphical instruction by presenting pictures and allowing the student to study the language by:
  - naming (in the foreign language) items in the picture.
  - pointing to items at the prompting of the Macintosh.
  - pointing and naming items themselves.

In all study modes, the Macintosh checks for the correctness of the answer, using appropriate language-dependent methods. In German, for instance, capitilization matters; and diacritical marks and word order may be important.
Current Status: This application has been used in fall and spring courses.

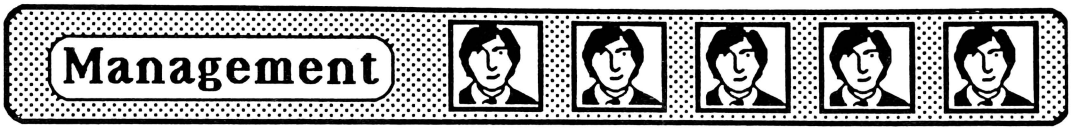
Project: Statistical Analysis of Text Files

A set of programs for statistical analysis of text files, including Reals-Frequency Distribution (Zipf's Law), Stem and suffix counts, Match to Word List, (for stopword counts, stylistic analysis). Current status: First versions completed.

Project: Russian Vocabulary

Contact: Joe Van Campen, Stanford University; (415) 497-2300

Some drills in Russian vocabulary and morphology are being transferred to the Macintosh. Current status: Continuing.



Project: Financial Models

Contact: John J. Clark, Department of Finance, Drexel University; (215) 895-2113

This project involves the programming of several key financial models, including a refunding model, lease versus buy analysis, and a valuation model.
Current status: The refunding model is completed.

Project: Linear Programming
Contact: Jon Burton/ Michael Feuer, Department of Management & Organizational Science, Drexel University; (215) 895-2142

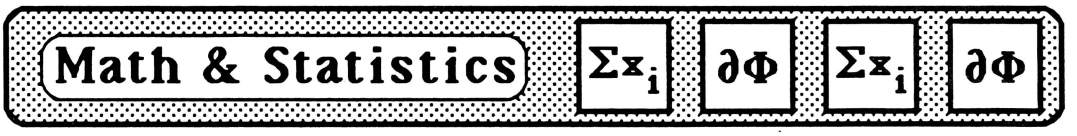
A linear program package for student use. This will be the first component of an eventual toolkit of analytical techniques. Two aspects of the programming package are use as a problem solver in coursework and a tutorial for teaching linear programming. Current status: Version 1.0 completed.

Project: Simulation and Queueing
Contact: Robert E. Laessig, Department of Management & Organizational Sciences Drexel University; (215) 895-2149/2110

A multiserver waiting-line model to illustrate Monte Carlo simulation and queueing theory. Students will be able to change the number of servers, the service rate, and the arrival rate to perform "What if?" cost and performance analyses. The model will also illustrate the use of spreadsheets for performing operational analyses under probabilistic conditions by means of simulation techniques. Current status: To be completed in Winter 1985.

Project: Marketing
Contact: Bert Rosenbloom, Department of Marketing, Drexel University ; (215) 895-2136

Software to provide graphical presentations of institutional structural changes in American distribution systems using U.S. Census or business data. Current status: To be completed in spring 1985.



Project: The Data Desk

Contact: Paul F. Velleman, 358 Ives Hall, Cornell University, Ithaca, NY 14853
Developers: Paul F. Velleman and Jerry M. Lefkowitz

The Data Desk is a full-function statistics package for the Macintosh. It has been designed from the ground up to take advantage of the graphics, mouse, user interface, and SANE numerics found on the Macintosh. All data entry and editing uses TextEdit conventions. All calculations take full advantage of SANE (and algorithms have been chosen accordingly). Many of the graphics are interactive.

We have tried to design a better environment for the entry, editing, manipulation, analysis, and display of data than is available in traditional statistics packages. Our initial goal is a package suitable for use in a two-semester introductory statistics sequence for undergraduates running on a 128K Macintosh. Future work will extend the package to support research statistics on Macintoshes with more memory available. The Data Desk provides a rich environment to which other, more specialized or sophisticated analysis modules can be added easily. Several such modules are being planned. Current status: Prototype versions of the program and documentation are being used

during this spring by 100 sophomores in a second-semester statistics course. Our experience shows that the program is easier to learn and use than traditional statistics packages. The instructional version should be available for September, 1985. Preliminary releases should be available in summer 1985 for evaluation.

Project: Multiple Regression Template.

Contact: David Ellerman, Computer Sciences, Boston College, Chestnut Hill, MA 02167; (617) 552-3975

This Macintosh Multiplan template performs least squares multiple regression. It is currently configured for data sets with three or fewer independent variables. The number of data points in the data set can be easily expanded, but it is usually 25 data points. Once the data has been entered, the calculations are initiated via the Calculate Now command. When the calculation stops, the multiple regression results can be obtained from the rest of the spreadsheet. The variance-covariance matrix is given. The ANOVA table is displayed, along with the overall F statistic, R-squared, and the adjusted R-squared statistic. Also included are the multiple regression beta coefficients, their standard errors, and their t statistics.

Current Status: Completed.

Project: Regression Sampling Program

Contact: David A. Belsley, Department of Economics, Boston College-Carney 129, Chestnut Hill, MA 02167

Reg Sampler is a regression sampling program that allows graphic depiction of the variation in regression-coefficient estimates that can occur in repeated samples for a given set of explanatory "X" data, or independent variable. The user is able to see the variability in estimated regression parameters that can indeed occur, the meaning of the notion that the Ordinary Least Squares (OLS) estimator is unbiased, and the interrelation of the estimates of the different coefficients. Beyond the direct value of such a demonstration, the user is given new insights into, and appreciation for, the operation of regression, the meaning of regression estimates, and the meaning of tests of significance.

Current status: Completed.

Project: Conformal Mapping Program

Contact: Andrea Martin, ICSA - Rice Univeristy, Houston, TX 77251; (713) 527-4965
Developed by: Rice Macintosh Software Development Project
Concept: Sam Davis, Chemical Engineering

Complex variables is one of the most visual areas of mathematics. A graphically-oriented program displays the effects of mappings of the complex plane on contours. The program computes complex-value functions and allows student specification of the contours and the mappings.

Current Status: Completed.

Project: Plotting Derivatives of a Calculus Function.

Contact: Andrea Martin, ICSA - Rice Univeristy, Houston, TX 77251; (713) 527-4965
Developed by: Rice Macintosh Software Development Project
Concept: Paul Pfeiffer, Mathematical Sciences

This program allows you to define a function with up to seven coefficients, plot the function, and calculate its derivative. Current Status: Completed.

Project: Linear Programming Template

Contact: David Ellerman, Computer Sciences, Boston College, Chestnut Hill, MA 02167 (617) 552-3975

This application is a Multiplan template using the simplex method to obtain a solution to linear programming problems. It can solve linear programs with five or fewer original variables (not counting slack, surplus, or artificial variables) and five or fewer structural constraints (not counting the usual non-negativity constraints on the variables). The right-hand side (RHS) of the constraints must be entered as non-negative, but the constraint relations can be any of three types (<=, =, >=). The objective function can be maximized or minimized. Current Status: Completed.

Project: Binary Trees

Contact: The Personal Computing Center, 1 McNutt Hall, Dartmouth College, Hanover, NH 03755; (603) 646-3249

This program allows the student to construct binary trees on the Macintosh, with various traversing and construction algorithms. He is able to see explicitly not only the results of adding items to the tree, but also the process. He can ask for a traversal of the tree, and watch it happen in whatever way specified. The program is used for teaching algorithms in introductory computer science courses. Current Status: Has been used in computer science courses.

Project: Solving Linear Systems

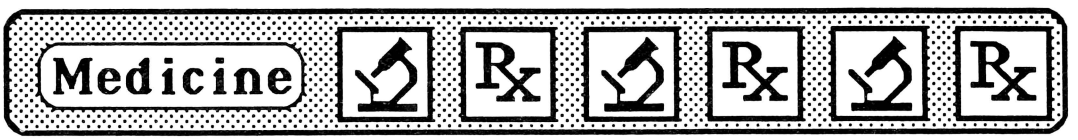
Contact: Bernard Kolman, Department of Mathematics and Computer Science, Drexel University; (215) 895-2683

Three rational arithmetic implementations of the Gauss-Jordan procedure for solving a linear system. (One of these is highly interactive). Also, a demonstration program for matrix multiplication. All of these have been successfully demonstrated to the 750 students taking Mathematics N540. Current status: Completed.

Project: Matrix Inversion and others

Contact: Bernard Kolman, Department of Mathematics and Computer Science, Drexel University; (215) 895-2683

Future work will extend some of the above implementations and develop programs for finding the inverse of a matrix, for encoding and decoding messages, and for finding the line of best fit for a given set of data. Current status: To be developed.



Project: Electrocardiogram Interpretation

Contact: Stephen Dubin, Department of Biomedical Engineering, Drexel University; (215) 895-2392

Ekteach uses animated graphics and interactive responses via the mouse, to teach interpretation of the electrocardiogram and to test the student with respect to the names of the EKG deflections, the amplitudes, and the time relationships of the normal EKG tracing. Current status: Completed.

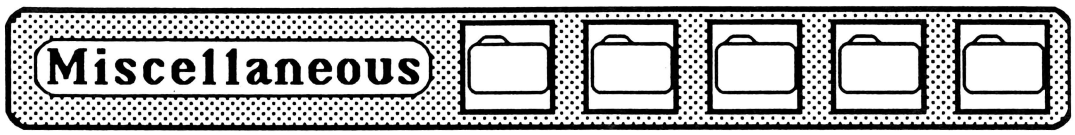
Project: Neurobiology: Wave Forms and Filters

Contact: Bruce Land, Department of Neurobiology, Cornell University; (607) 256-4981 c/o Tom Hughes

This program produces a high/low pass filter which is fully controlled by the Macintosh mouse. The filter is a first order, infinite-impulse response design, digitized by an amplitude-adjusted, impulse-invariant transform. It acts like a simple RC filter. The application is written in MacFORTH. In the input window, one can select sine, step, or impulse waveforms or, by clicking in the content region, freeform input. The filtered waveform appears in the output window. The cutoff

frequency of the filter is chosen in the output window, and the high/low selection is done by menu. The unit of frequency is cycles per window. Current status: Completed

Project: Macintosh Applications
Contact: See below; Stanford University ; (415) 497-2300
There are several projects under development. Dr. Paul Hensleigh is working on a computer-based teaching program in high-risk obstetrics. Roy Maffly is building a set of computer-based materials for a medicine course in water and electrolyte metabolism. Current status: Under development.



Project: Introduction to Drexel's Microcomputing Program

Contact: Lucy Wozny, Computer Center 9B-0019, Drexel University, Philadelphia, PA 19104

The Drexel Disk is an introduction to Drexel's Microcomputing Program. It exploits the Macintosh's graphics capabilities by using animation as well as detailing the Drexel microcomputing facilities on a campus map. The disk provides tips and short cuts on subjects such as hardware, MacWrite, MacPaint, Multiplan, printing, and others. These tips have been collected since January 1984 by the Micro User Support Group, and represent items that are not clearly explained elsewhere. Information on copyrights and warranties, called Rights and Responsibilities, is also included. To obtain a copy, send a blank disk and return envelope to Lucy Wozny at the above address.
Current status: Version 2.0 completed.

Project: BenchTop Products for the Sciences

Contact: Metaresearch, Inc., 1100 SE Woodward, Portland, OR 09702; (503) 232-1712

The BenchTop product line was developed at Reed College. It was designed to solve a traditional problem facing science teachers and their students. For decades, science education at almost every level has been plagued with budgetary constraints in regard to laboratory apparatus. The Macintoshhas the ability to display Iconic instrumentation, that is, cartoons of apparatus. Such Iconic apparatus are equivalent to traditional apparatus, provided that the data displayed is real, and that the panel operations are precise.

The chief software products are The BenchTop which creates a powerful laboratory network system, and Rascal (see description under Computer Science) a real-time Pascal. These applications allow the user to define and operate instruments. The hardware products are a Universal Microcontroller, a laboratory single-board computer based on Intel microprocessors; and the BenchTop Instrument, a customizable, shielded instrument box. Both hardware devices talk to the Macintosh according to a rigorous protocol.
Current status: Universal Microcontroller completed. Consortium price: $500. Retail price: $750.

Project: MacPress

Contact: Norm Meyrowitcz, Scholar's Workstation Group Manager, Brown University

Researchers at Brown (IRIS) are presently testing a program that allows documents created with MacWrite, the Macintosh word-processing program, to be printed on the Xerox ™ 9700 Laser Printer.

The idea for the development of the **MacPress** program grew out of the Lisa Project, as IRIS needs-analysts and a faculty committee identified several crucial areas for research and development. One of these projects involved developing an interface from a microcomputer to a high-quality printer. IRIS staff considered a number of options, including an interface between the Apple Lisa and the 9700.

Several intervening factors, however, caused IRIS to weight its decision in favor of a Macintosh-9700 link. Apple's shift in development emphasis away from the Lisa and toward the Macintosh meant that few or no very useful new applications were expected to be released for the Lisa. Meanwhile, the Macintosh, the portable and more affordable kin of the Lisa, was enjoying a tremendous popularity at Brown. The affordability of Macintosh, along with its high-quality graphics and black-and-white bit mapped display, meant that the Macintosh could be considered a viable entry-level microcomputer for students. A Macintosh-9700 link would thus provide students with the high-quality printing they would otherwise be unable to afford.

IRIS Systems Researcher Tom Padula coordinated a team of developers from IRIS, the Computer Science Department, and the Computer Center that put together the intricate structure and wrote the complex programs needed to create the link. The user, however, need never know how to operate anything other than a Macintosh. The interface that the Macintosh displays will work just like all Macintosh programs. Using the mouse, the user simply selects the desired printer and logs onto the Computer Center's IBM 3081 mainframe. **MacPress** accepts the information and stores it as a default for future use. Moving to the File menu, the user selects Print and then the appropriate file ("Resume") from the displayed list of documents contained on the disk.

From there a complex series of translation and transfer programs takes over, but this process is transparent to users; all that they are required to do is walk over to the Computer Center and pick up the printout. IRIS will release the program to the Brown community during the the spring semester. Padula has perfected the program, and eliminated the few "bugs" that formerly inhabited the program. Now, the program works from T-Boxes and modems, and performs a number of complex formatting functions.

As part of the campus-wide Scholar's Workstation Project, MacPress will aid in the migration of computer use away from mainframe/terminal services and toward distributed networks of graphics-based workstations. **MacPress** can be modified easily to accommodate other printers, eventually even lower-throughput laser printers housed in dormitories or other convenient campus locations. Current status: Completed.

Project: Atlas, a Pictorial Atlas Program

Contact: Stever Maker, Project Director, of Academic Computing, Dartmouth College, Hanover, NH (603) 646-2643
Developer: Carl Spitzer Concept: Leo Spitzer and David Lagomarsino, History Department, Dartmouth

This program will allow a faculty member to teach by means of a pictorial atlas on the Macintosh. He creates a set of images (with MacPaint, a video digitizer, or other means) on the desired subject (for instance, European History, or frog anatomy), and gives the resulting dataset to the students on a Macintosh disk with the Atlas program. When the Atlas program is run on that dataset, it allows the student to:

- view the images on the Macintosh

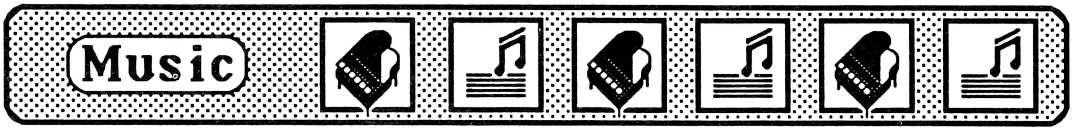
- specify a set of overlays to view (e.g., river, towns, mountains and roads, or nervous system, circulatory system, and skeleton)
- zoom in and out on the image, with the overlay set remaining intact
- study by giving the name for a feature the Macintosh highlights, pointing to a feature for which the Mac asks by giving its name, or pointing to a feature and giving its name.

Current Status: the program is well under way, with zooming and overlays working.

Project: Programmable Screen-board

Contact: Peter Olivieri, Computer Science, Boston College; (617) 552-3907

Programmable keyboards have provided the opportunity for a variety of customized applications. This project involves the design of an application that allows the user to design programmable keyboards of various sizes and types that appear on the screen and are activated by the mouse. Current status: Prototype working. Expected to be finished in spring 1985.



Project: Mozart

Contact: The Personal Computing Center, 1 McNutt Hall, Dartmouth College, Hanover, NH 03755; (603) 646-3249

Mozart is a minuet-building program on the Macintosh. It is based on a famous minuet by Mozart, written in such a way that a certain set of phrases may be combined in various ways to produce a reasonable minuet. The student selects a phrase from a graphical display of musical staves, and builds the minuet. He may also apply dynamic marks, which are used when he plays back the selection. Current Status: Under development.

Project: AppleTones

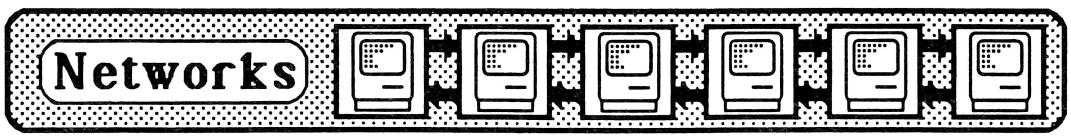
Contact: The Personal Computing Center, 1 McNutt Hall, Dartmouth College, Hanover, NH 03755; (603) 646-3249

AppleTones is a music-building program on the Macintosh. The student builds a musical piece by selecting bars from a palette of single notes, chords, glissandi, and more. For each bar, the timbre, volume and duration may be changed. He may then play the resulting piece (using the Macintosh's sound capability), save the work, and edit it. Current Status: Being used in introductory music courses.

Project: Musical Slide Show

Contact: NA (Try the University Technical Contact), Drexel University; (215) 895-2695

With no need to become programmers, users will be able to write music on the screen (notation that can be printed out), to hear the score played through the Macintosh's speaker (or an external system), to add text and graphics as required, and to edit the results to form a "slide." Series of these slides can be used to create programmed lessons for various music courses.



Project: AppleBus Network

Contact: Jim Perry, Kiewit Computation Center, Dartmouth College; (603) 646-2643

Darterminal provides network services to Macintoshes on an AppleBus network (internet). Darteremінal runs protocols specific to Dartmouth's Kiewit network and will not run elsewhere without substantial work. It provides:

1 Multiple virtual terminal connections to host computers.
2 Transfer of arbitrary Macontosh files to and from host.
3 Tektronix 4012 graphics emulation.
4 Network alerts to users.

Current Status: Completed (improvements continuing).

Project: Nutrient Analysis

Contact: Shortie McKinney, Department of Nutrition and Food Sciences, Drexel University; (215) 895-2392

This nutrient analysis system (on two disks) uses the linked files option of Multiplan. It includes nutrient data on approximately 1200 foods. Nutrient totals will be compared to the Recommended Dietary Allowance (RDA). Energy balance can be calculated based on Basal Energy Expenditure (BEE), formulas, and actual activities. Bar graphs are available for comparison of RDA nutrients and percentages of carbohydrate, protein, and fat, as well as ideal body weight and caloric consumption versus expenditure.
Current Status: Completed.

Project: Diet Planning Program

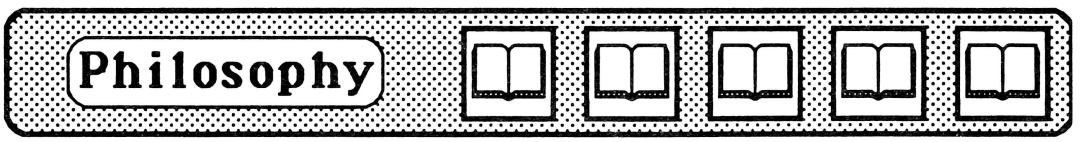
Contact: Stephen Dubin, Department of Biomedical Engineering, Drexel University; (215) 895-2392

This program aids in planning and evaluating the diet for patients with chronic renal failure by predicting the metabolic consequences of their food choices and allowing them to be compared with the nutritional goals set by their physician or dietitian. Facilities are provided for up to six meals in the daily plan. About 700 foods in 14 categories will be stored in the nutritional database, and this database may be edited, by the user, to suit a particular ethnic or regional diet preference. Current status: To be completed by February 1985.

Project: Nutrient Analysis

Contact: Shortie McKinney, Department of Nutrition and Food Sciences, Drexel University; (215) 895-2392

A nutrient analysis system using Multiplan has been developed, making nutrient data available on 150 foods. Nutrient totals are compared to the RDA. Current status: Completed.



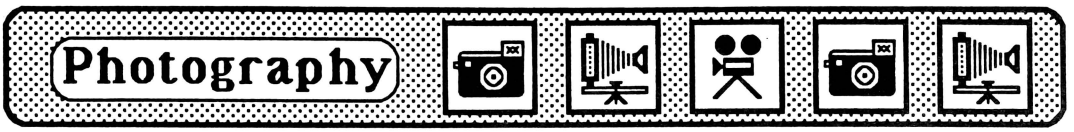
Project: Venn, a Philosophy Tutor

Contact: The Personal Computing Center, 1 McNutt Hall, Dartmouth College, Hanover, NH 03755; (603) 646-3249

This program allows the student to solve syllogisms by using Venn diagrams. It offers:

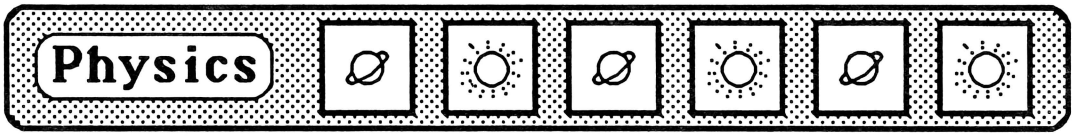
- practice with Venn diagrams on single logical sentences
- single-sentence inferences
- syllogisms (two premises and an inference)

Venn randomly makes up syllogisms and shows them; the student represents the premises with a Venn diagram, using MacPaint-like filling of regions with patterns. The program checks the diagram, and the student indicates whether s/he believes the syllogism to be valid or invalid. The program tells the student whether s/he is correct or not.
Current Status: Being used.



Project: F-stop Drill and Practice
Contact: David Staebler, Department of Design, Nesbitt College Drexel University; (215) 895-2392
A software-based drill and practice worksheet designed to test and strengthen students' understanding of the camera's f/stop scale. Worksheet features help when requested or when triggered by two consecutive incorrect responses. Software will run on Apple IIe. Current status: Completed.

Project: Photographic Enlargements
Contact: David Staebler, Department of Design, Nesbitt College, Drexel University; (215) 895-2392
A software-based tutorial on making enlargement prints (for beginning photographers). It is designed to confront students one step at a time with the many decisions that need to be made in order to make high-quality enlargements. Conversion from Apple IIe to Macintosh will take place as soon as MacBASIC is available. Current Status: To be completed in January 1985



Project: Elementary Quantum Mechanics

Contact: Robert Gilmore, Department of Physics, Drexel University; (215) 895-2779

Elementary Quantum Mechanics in 1 Dimension comprises five programs that compute the following:

1 Transmission/reflection coefficients for piecewise constant potentials.
2 Energy eigenvalues for bound states in piecewise constant potentials.
3 Energy bands in one dimensional piecewise continuous periodic lattices.
4 Density of states in one dimensional piecewise continuous periodic lattices.
5 Energy eigenvalues in arbitrary binding potentials.

Curent status: Completed, but not yet documented.

Project: Prelab Tutorials
Contact: Bill Eidson or Stan Cohen, Department of Physics, Drexel University; (215) 895-2714
Prelab interactive tutorials, data collection and analysis, curve-fitting, and graphical display for Physics I, II, III labs (12 total).
Current status: I and II completed, III to be completed by December 1984.

Project: Physics Exercises
Contact: Prof. Blas Cabrera Stanford University; (415) 497-2300
The project consists of a set of ten exercises designed to improve student's intuitive sense of several physical laws, the mathematics of which are covered in class. Exercises already implemented include projectile motion, potential well, Kepler's orbit, harmonic oscillators, and special relativity. Current status : Completed and continuing.

Project: Elementary Particle Theory
Contact: Savas Dimopoulos, Stanford University; (415) 497-2300
Four programs (out of a total of eight) have been completed for a physics series on Elementary Particle Theory and on Symmetrics and Lagrangians. Current status: Completed and continuing.

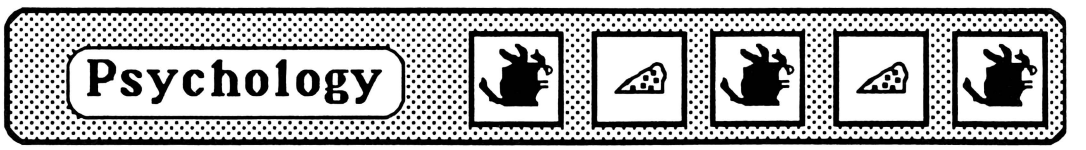
Project: Basic Physics Applications

Contact: Leonard Cohen, Department of Physics, Drexel University; (215) 895-2710

This series of 14 programs in basic physics is intended for use in lecture demonstrations and for individual study by students.

1 Vector one: An animated diagram that shows the viewer how to take components of a vector on a set of X-Y axes.
2 Vector two: Illustrates the adding together of two vectors by both the graphical and component addition techniques. (The processes are fully animated.)
3 Plane one: Describes the general technique for solving mechanical problems on an inclined plane. It also illustrates the preferred coordinate system and the resolution of the forces present onto these axes.
4 Hanging One: Illustrates a typical statics problem involving a weight suspended by two ropes making arbitrary angles with a wall and a ceiling. (The resolution of all of the forces present onto appropriate axes is illustrated by animation.)
5 Shooting Ball: Shows a ball being projected vertically upward with an initial velocity. (The subsequent motion of the ball is simulated, and the potential and kinetic energies are graphed.)
6 Roller Coaster: Simulation of two dimensional motion. This is the problem of an object undergoing roller coaster motion. (The normal force of the track on the object is shown throughout the motion. The kinetic and potential energy functions are graphed.)
7 Momentum: Two hockey pucks collide and their motion is simulated. (The momentum function for each of the pucks is plotted.)
8 Graphing: A simple graphing routine to permit the plotting of a function of x versus x.
9 Simple Harmonic Motion: A weight attached to a vertical spring is set into motion. (The amplitude, velocity and acceleration of the weight is plotted as a function of time.)
10 Kinetic Gas Theory: A ball is permitted to bounce off four walls. Arrows indicating the component velocities of the ball follow the motion of the ball: (This simulation permits one to develop basic kinetic gas theory.)
11 Standing Wave: Demonstrates the principal of superpositions of waves that result in standing waves.
12 Bent Frequencies: Demonstrates the addition of two waves of nearly the same frequency resulting in " beat" frequency patterns.
13 Wave Superposition: Shows the way in which two square wave pulses interact on a string. (Constructive and destructive interferences are shown. Also reflections from a rope end which is tied down, and from an open-ended rope are also shown.)
14 Ray Diagrams: Typical ray diagrams drawn for thin lenses and spherical mirrors.

Current status: 1-7 completed; 8-14 are being converted from Apple IIe to Macintosh. All conversions will be complete by summer 1985.



Project: Geometrically Rotated Text

Contact: David M. Lane, Department of Psychology, Rice University, Houston, TX 77251-1892; (713) 527-8101,3412

There are three fonts useful for experiments in the fields of human perception and memory. Each require the presentation of geometrically rotated text. Each is rotated about a different axis. More information will be published in an upcoming issue of the Behavior Research Methods, Instrumentation, and Computers.

Current Status: Completed.

Project: Stimuli for Recognition Memory Experiments

Contact: John Brooks, Department of Psychology, Rice University, Houston, TX 77251-1892; (713) 527-8101

Snodgrass and Vanderwart in 1980 published norms for 260 line drawings. Each drawing is rated on name agreement, image agreement, familiarity, and visual complexity. These stimuli have been digitized and stored in MacPaint format for easy use in memory experiments.

Current Status: The digitizing has been completed. A Microsoft BASIC program that can be used to present the stimuli should be completed by the time this is published.

Project: Machine Language Library for Use in Psychology Experiments

Contact: David M. Lane, Department of Psychology, Rice University, Houston, TX 77251-1892; (713) 527-8101,3412

Microsoft BASIC allows programmers to provide their own machine-language libraries to supplement the BASIC language. This library will contain a series of routines designed to be used in psychology experiments. Currently, there are programs to do the following:

- Shuffle an array of integers quickly (6000 or so in a second). This is useful for sampling without replacement.
- Black out the entire screen.
- Present a series of stimuli tachistoscopically and record reaction time.

One program under development will allow the sound driver to be used in dual-task and reaction-time experiments. Another will measure the time it takes to move the mouse to a specific area on the screen. This will be useful in motor-learning experiments, particularly investigating Fitt's Law.

Current Status: Library should be completed by this summer.

Project: Analysis of Variance Program

Contact: David M. Lane, Department of Psychology, Rice University, Houston, TX 77251-1892; (713) 527-8101,3412

This program is written in Microsoft BASIC and can analyze data from factorial designs with up to five between-subject variables and five within-subject variables. Unequal cell sizes are accommodated by using unweighted means analysis. The program follows the Macintosh User Interface guidelines.

Current Status: A working version is available now. One with more flexible input formatting should be available by summer.

Project: Demonstration Experiments in Psychology

Contact: David M. Lane, Department of Psychology, Rice University, Houston, TX 77251-1892; (713) 527-8101,3412

Microsoft BASIC programs (with the occasional use of machine language routines for

tachistoscopic presentation and timing of responses) are being developed to demonstrate classical findings in experimental psychology. Iconic memory, lexical decision, memory scanning (using the additive factors approach), memory span, and recognition memory can be demonstrated.
Current Status: Many of the programs are now working but need to be better documented and rewritten to take advantage of the new version of BASIC. Should be completed by August 15, 1985.

Project: Perceptual and Motor Skills

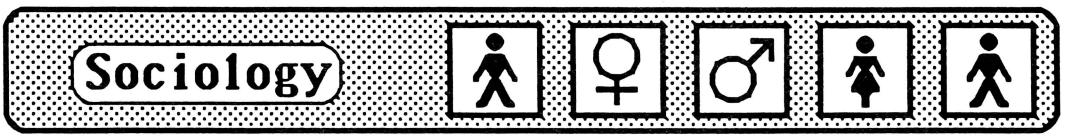
Contact : Doug Chute, Department of Psychology and Sociology, Drexel University; (215) 895-1722

A project is underway to measure perceptual and motor skills (mirror tracing and pursuit motor experiements) for an introductory psychology course. Current status: Expected to be completed in April, 1985.

Project: Central Nervous System

Contact: Doug Chute, Department of Psychology and Sociology, Drexel University; (215) 895-1722

This project involves an introduction to the structure and function of the central nervous system. Current status: Expected to be completed in April, 1985.



Project: SocStat: A Program to Compute Sociological Statistics
Contact: The Personal Computing Center, 1 McNutt Hall, Dartmouth College, Hanover, NH 03755; (603) 646-3249

SocStat is a Sociology Laboratory on a Macintosh. It uses data sets from actual sociological surveys (we currently have six available) and allows the student to do elementary statistical analyses on them. Each dataset consists of up to 2000 observations on up to 10 variables; each variable may have any of several values (i.e., responses by the subjects of the survey).

The student can select a dataset, and perform a set of analyses on it: absolute or relative frequency tabulations, cross-tabulations (with dependent, independent and possible control variables), Yule's Q and Gamma tests, and Chi Square tests.

The results of each analysis appears in a window, along with the specifications for that analysis. Many windows can be created. Any window can be printed and handed in to the instructor as homework.
Current Status: Used in fall courses.

Project: Industrial Sociology Applications
Contact: Art Shostak, Department of Psychology and Sociology, Drexel University; (215) 895-2466

An instructional program for use in "Industrial Sociology," it will enable students to test their grasp of labor force dynamics, explore their own career destinations, and build models of alternative work worlds in 2000 A.D.
Current status: To be completed by September 1985.

Project: Kermit

Contact : Andrea Martin, ICSA - Rice Univeristy, Houston, TX 77251; (713) 527-4965
Developed by: Rice Macintosh Software Development Project

Kermit is a program that lets microcomputers and mainframe computers communicate and transfer files safely. This implementation uses a standard Macintosh interface, supports server mode, and allows you to change the start of header character and various communications settings. It will also allow you to send full applications as well as text-only documents. Eighth-bit prefixing is supported.

Current Status: Currently in beta test. A version will be distributed at the March Consortium meeting.

Project: GriffinTerminal™

Contact: Metaresearch, Inc., 1100 SE Woodward, Portland, OR; (503) 232-1712

GriffinTerminal was developed at Reed College. It is a Tektronix 4012 terminal emulator with complete graphics-animation capabilities. GriffinTerminal can transfer text and graphics files with easy, menu-selectable commands at baud rates of up to 38.4K. We most typically use GriffinTerminal for communicating between our Macintoshes and a mainframe with a UNIX™ operating system, but we also found it to be very useful for downloading code to external laboratory computers and devices for data collection and appliance control. GriffinTerminal now has QuickDraw capability and mouse interrogation routines.

Current status: Completed. Consortium price: $45. Retail price: $89.

This "MACINTOSH PRODUCTS" portion of **WHEELS FOR THE MIND** will provide information about third-party products for the Macintosh. All information will be organized by application area where appropriate. Any reviews of products will be unashamedly subjective and will usually reflect the opinions of one user. Please use the reviews as a reference point only. In order to conserve space, yet provide an up-to-date document, items that have appeared in an earlier issue of **WHEELS FOR THE MIND** will be displayed in a smaller type size.

If the phrase, "NO FEEDBACK YET" appears next to a selection, it simply means that the person preparing the review has not yet tried the product, or has not received feedback from other users. As we get reactions to various products, this, of course, will change. **If there are articles or reviews available for a particular product, these citations will appear along with the product description.**

Some products that you would expect to see in this listing are not yet here. This , too will change in the near future. By the next issue, we hope to have an exhaustive list of Macintosh products. As we progress through the year, this list should become annotated with the experiences and comments of all of you readers out there.

Thus, in time, this section could become a very valuable resource for those selecting or recommending available Macintosh products. In fact, it may be the only such reference available. However, it'll only work if you help make it work! Please send in your observations about the Macintosh products you have used.

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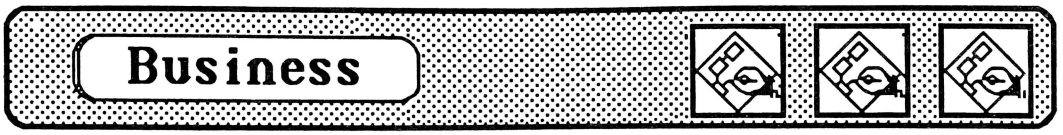


Front Desk™ by Layered, Inc. maintains schedules for up to 15 people, places, or things, allowing the user to look at everyone's calendar, weekly schedule, or monthly schedule. Helps keep appointments and schedules. (617) 423-9041 (Mass.). (NO FEEDBACK YET)

Spreadsheet Link by DowJones Software (used with Multiplan) and Dow Jones® **Market Manager PLUS** for portfolio Management. (800) 345-8500, x100. (NO FEEDBACK YET)

Back to Basics Accounting System by Peachtree Software is an uncomplicated, easy-to-learn accounting system for small businesses. Includes General Ledger, Accounts Payable, and Accounts Receivable. (800) 554-8900. (NO FEEDBACK YET)

Back to Basics in Accounting **A+ MAGAZINE** Apr. 1985 P. 65

General Ledger is the first model in a series of business-related software to be introduced for the Macintosh. It allows the user to create a balance sheet, profit and loss statement, and a trial balance. The Smoothtalker™ speech synthesizer is incorporated into the application to warn of errors and mistakes. Some of the reports possible include projected income and expense accounts, comparative analyses, variance reports, detailed journals, P&L statements and much more. Price $395. Vendor : Future Design Software, 13681 Williamette Dr., Westminster, CA 92683; (714) 891-9796 . (NO FEEDBACK YET)

Accounting Series for a hard disk (the Tecmar hard disk is necessary; other drives will be added to the compatible list shortly). The first modules to be announced include General Ledger, Accounts Receivable, Accounts Payable, Payroll, and Inventory Management. (Other modules under development are Job Costing, Estimating, and Prebilling.) Each module retails for $695. Vendor: Great Plains Software, 1701 S.W. 38th St., Fargo, ND 58103; (701) 281-0550. (NO FEEDBACK YET)

Maccountant is an accounting package designed for small businesses. With it, you can prepare Income Statements, Accounts Payable, Accounts Receivable, Balance Sheets, and General Ledger accounts. Free demo disk available. Price $195. Vendor: Digital Etc., 1749 14th St., Santa Monica, CA 90404; (213) 452-5636. (NO FEEDBACK YET)

MacInTax™ is an income tax program for individuals. It is mouse driven and contains the complete IRS instruction book on disk. Should be shipping by March 1, 1985. Call to see if it is ready and if it contains the IRS forms that you need. Price $75. Vendor: SoftWeave, 400 Mobil Ave. Bldg. D, Suite C, Camarillo, CA 93010; (805) 388-2626. (NO FEEDBACK YET).

Tax Wizard is a program that allows access to more than 20 IRS forms. Call to see if it is ready and if it contains the IRS forms that you need. Price $64.95. Vendor: Software Resource (distributor), 817 Tenth St. #102, Santa Monica, CA 90403; (800) 851-9010 or (800) 851-9009. (NO FEEDBACK YET).

Tax Planner uses Microsoft's Multiplan to provide a very comprehensive set of tax templates. Complete tax tables are included. Call to see if it is ready and if it contains the IRS forms that you need. Price $49.95. Vendor: Apropos Software, Inc., 64 Hillview Ave., Los Altos, CA 94022; (415) 948-7227. (NO FEEDBACK YET).

Tax-Prep uses Microsoft's Multiplan package to help the wage earner prepare up to 22 different tax schedules and forms. Call to see if it is ready and if it contains the IRS forms that you need. Price $99.95. Vendor: EZ Ware Corporation, 17 Bryn Mawr Ave., Bala Cynwyd, PA 19004; (215) 667-4064. (NO FEEDBACK YET).

Tax Manager calculates, prepares, reviews and prints federal income tax forms. It automatically will choose the method that results in the least amount of tax for your income situation. Call to see if it is ready and if it contains the IRS forms that you need. Price $180. Vendor: MicroLab, 2699 Skokie Valley Road, Highland Park, IL 60035; (312) 433-7550. (NO FEEDBACK YET).

The Tax Man Cometh (several packages) **MACWORLD** March 1985 P. 106

MegaForm™ is a forms designer that reminds you of a spreadsheet, database, forms generator, and report generator. Information on one of your customized forms can be automatically calculated, much like a spreadsheet. Provides a library of ready-made forms ranging from invoices to tax forms; numbers forms sequentially; works with preprinted forms, if you wish; has MacPaint-like drawing tools; and provides a selection of business graphics for your use. Price $?? Vendor: Megahaus, 5703 Oberlin Drive, San Diego, CA 92112; (800) 358-8882 or, in Calif. (619) 450-1230. (NO FEEDBACK YET)

Dollars and $ense™ by Monogram helps you manage your money. It defines budgets on up to 120 accounts, writes checks, makes transactions automatically, and can prepare a full set of reports and graphics. (213) 215-0529 (Calif.). (NO FEEDBACK YET)

MacFinance is a financial analysis application. With it you can determine the future value of an investment or calculate liquidity ratios, market ratios, activity ratios, ROI, depreciation, cost analyses, BE analysis, bond yield analysis, as well as loan and mortgage calculations. Price $99.95. Vendor: Superex Business Software, 151 Ludlow St., Yonkers, NY 10705; (800) 862-8800 or, in New York (914) 964-5200. (NO FEEDBACK YET).

Stock Portfolio System helps you manage a portfolio of stocks, bonds, mutual funds, options, CDs, and money market funds, as well as other cash investments you might have. Once data has been entered (either typed in or downloaded from Dow/Jones), nine reports can be generated. These include Profit and Loss Statements, Current Portfolio Status, Interest Income and Expenses, and a Dividend Income

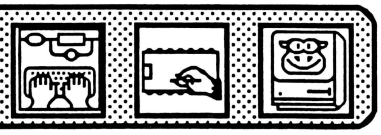
Statement. Up-to-date tax laws (1984) are included. You need a 512K Macintosh for this application. Price $225 (annual updates will be $65). Vendor: Smith MicroSoftware, Inc., P.O. Box 7137, Huntington Beach, CA 92615; (714) 964-0412. (NO FEEDBACK YET).

The Investor is designed as an aid in financial decision-making and tax-planning. It is a computerized management system design for handling stocks, funds, bonds, margin accounts, and much more. The standard analysis reports are possible. A graphics feature allows the user to plot various relationships. Automatic updating by connecting to Dow-Jones service is supported. A simulation feature permits the asking of "What if?" questions concerning your buying and/or selling preferences. Price $150. Vendor : P^3, Inc., 949 Parklane Center, Wichita, KS 67218; (316) 686-2000. (NO FEEDBACK YET)

Business Related Articles

The Mac Office	**A+ MAGAZINE**	Mar. 85	P. 26
Apples for the Office	**INFOWORLD**	12/31/84	P. 26
AppleTalk Network	**A+ MAGAZINE**	Mar. 85	P. 35
AppleTalk Developers	**INFOWORLD**	3/11/85	P. 20
Laser Fonts	**MACWORLD**	Feb. 85	P. 45
The LaserWriter	**MACWORLD**	Feb. 85	P. 70
Macs on the Audit Trail	**MACWORLD**	Feb. 85	P. 150
Corporate Computing	**A+ MAGAZINE**	Apr. 85	P. 78
MacProject	**MACWORLD**	July/Aug. 84	P. 52
MacProject (Review)	**INFOWORLD**	3/11/85	P. 37
Habadex Appt. Book	**INFOWORLD**	10/1/84	P. 62
The Sales Edge Behavioral	**MACWORLD**	DEC. 84	P. 102
Misc. Business Applications	**A+ MAGAZINE**	DEC. 84	P. 144

Computer Languages



Microsoft BASIC 2.0 is available from Microsoft. It is significantly better than its earlier version. Some of the new features include the ability to create your own custom menu items, dialog boxes, windows, buttons, and much more. The new manual is bigger and better and includes clear and accurate examples of event trapping and a variety of other programs illustrating how to take full advantage of the unique Macintosh interface. It is an interpreted BASIC so it is a bit slow. However, the new features and an improved user interface make this a very good choice for BASIC users or teachers.

Microsoft BASIC	**A+ MAGAZINE**	Jun. 84	P. 123, 132
Microsoft BASIC 2.0	**MACWORLD**	Dec. 84	P. 86
Microsoft BASIC 2.0	**BYTE**	Jan. 85	P. 155

Microsoft BASIC for the Macintosh (1.0) by Goldstein (Brady Communications)

CP/M for your Macintosh. For $395 you get two volumes of documentation from Digital Research and IQ Software with six disks of programs. These programs include CP/M; a C language compiler, Macro-Assembler, Terminal Emulation, and a Standard Printer Driver for setting up your own printer configurations. CP/M 68K programs will run on your Macintosh. Plus CP/M 2.2 (8080) will run on your 512K machine. Write for a Macintosh™ CP/M Software Catalog. IQ Software, 2229 E. Loop 820 N., Ft. Worth, TX 76118; (817) 589-2000. (NO FEEDBACK YET)

BASIC Compilers. Pterodactyl Software is designing a PC BASIC compiler than will compile your programs on the Lisa (Macintosh XL) so they can run on the Macintosh. It is not only compatible with the IBM PC BASIC compiler, but numerous extensions are added (mouse and quickdraw routines). The Lisa version of PC BASIC runs under the Lisa Workshop. It is ready now. The Macintosh cross compiler requires a Lisa with Workshop and Software Supplement. Current prices : Lisa to Macintosh Cross Compiler $1000 (with runtime license); Lisa Compiler $250 (without runtime license). Vendor: Pterodactyl Software, 200 Bolinas Road #27, Fairfax, CA 94930; (415) 485-0714. (NO FEEDBACK YET)

Neon is an **object-oriented programming language**. It uses an environment like Smalltalk to allow access to the Macintosh Toolbox. Programmers can then use the objects in the Toolbox to create programs. Using this language results in very compact and executable code. Portions of any program that is written can be done in Assembly Language to improve speed. Included in the language is easy access to QuickDraw routines and a mouse-driven editor. Price $150. Vendor: Kriya Systems, Inc., 505 N. Lake Shore Drive. #5510, Chicago, IL 60611; (312) 822-0624. (NO FEEDBACK YET).

MacNosy™ is called by some "the **Disassembler** for the rest of us." It is an interactive disassembler that enables Macintosh developers and Macintosh hackers to recover the source code of any Macintosh application file, ROM, or code-type resources in the System File. It runs on 512K Macintosh and one megabyte Lisa systems. With it the developer can do the following: Subdivide a program into procedures using a treework and flow analysis, selectively view procedures, produce a reference map for procedure names or trap names, and much more. Use of this product requires knowledge of programming and assembly language. Price is $50 and is available directly from Jasik Designs, 343 Trenton Way, Menlo Park, CA 94025. (NO FEEDBACK YET)

MacTraps™ is a collection of the PROCEDURE and FUNCTION calls on the Apple Macintosh computer. With this valuable programmer's resource, you can access the format of many of the codes referenced in Inside Macintosh. There are three different types of objects in MacTraps™ : (1) Names describes either the name of the chapter or the name of the section(s), (2) Nodes are the icons representing the names, (3) Links are the lines that let you select what chapter you wish by clicking on the line and then linking to the file of interest. Vendor: Network Nexus, 3 Twin Dolphin Dr., Suite 220, Redwood City, CA 94065; (415) 591-2101. (NO FEEDBACK YET)

Macintosh Pascal is an interpreted Pascal. The main difference between it and UCSD Pascal is the screen environment within which you work. Running, stepping,

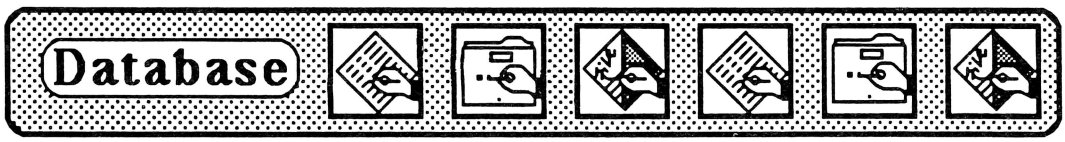
filing, editing, and printing operations can all be performed within windows on the Macintosh screen. Available from Apple Computer.

Microsoft Pascal	**MACWORLD**	May-Jun. 84	P. 86
Pascal	**POP. COMPUTING**	Oct. 84	P. 90
"Why Use Pascal?"	**A+ MAGAZINE**	Oct. 84	P. 79
Mac Pascal	**A+ MAGAZINE**	Nov. 84	P. 103
Mac Pascal Primer Part I	**A+ MAGAZINE**	Mar. 85	P. 95
Mac Pascal Primer Part II	**A+ MAGAZINE**	Apr. 85	P. 95
Macintosh PASCAL by Moll/ Folsom	(Houghton Mifflin)		

MANX SOFTWARE SYSTEMS has **AZTEC C68K C** for the MACINTOSH ($499). Also, **AZTEC C68K-P** ($199), **AZTEC C68K TOOLS** ($249). (800) 221-0440 or, in NJ call (201) 780-4004. (NO FEEDBACK YET)

Miscellaneous Articles on Computer Languages

Assembly Language Programs	**A+ MAGAZINE**	Mar. 85	P. 103
Assembly Language Programming	**A+ MAGAZINE**	Feb. 85	P. 109
Mac Assembler	**A+ MAGAZINE**	Dec. 84	P. 135
MACFORTH	**MACWORLD**	Nov. 84	P. 68
The POSTSCRIPT Language	**MACWORLD**	Feb. 85	P. 106
PostScript Graphics	**A+ MAGAZINE**	Mar. 85	P. 30
To C or Not To C	**A+ MAGAZINE**	Apr. 85	P. 87



Microsoft File is a sophisticated data-base product that is well integrated with the Microsoft series of programs (Multiplan, Word, Chart). A more extensive review will be given in the next issue.

Filevision is a data-base that allows the user to create a picture and then attach records and fields of information to various parts of the picture (or pictures). Consider, for example, designing an on-screen picture of the seating plan in a theatre. You could ask questions like : "Show all empty seats in the theater. Bring up the record of who is sitting in Row 5 Seat 56." This package is limited only by the creativity of the user. For the right application, this is an excellent product. Telos Software Products, 3420 Ocean Park Blvd., Santa Monica, CA 90405; (213) 450-2424. Price $195 retail.

Filevision (Telos)	**MACWORLD**	Jan. 85	P. 62
Filevision (Telos)	**POP.COMPUTING**	Mar. 85	P. 60

Filevision (Telos)	**INFOWORLD**	12/10/85	P. 49

Factfinder™ is made by Macware and is an electronic "desk drawer" that facilitates manipulation of data within the database. (800) MACWARE.

FactFinder	**MACWORLD**	Feb. 85	P. 84

Mainstreet Filer™ is a data-base management system. Some of its characteristics include 36 fields per record, 65,000 records per file. Can be used for customer/prospect lists, direct mail and renewal lists, appointments, inventory control, accounts payable and receivable reminder files, sales activity and follow-ups. This product has been out for a while so there should be a good deal of feedback available about it. Vendor: MAINSTREET Software, One Harbor Drive, Sausalito, CA 94965; (415) 332-1274 or (800) 824-8757.

Mainstreet Filer	**INFOWORLD**	8/6/84	P. 57
Mainstreet Filer	**MACWORLD**	Jan. 85	P. 86

1ST BASE™ is a relational database system from DeskTop Software Corporation, 228 Alexander Street, CN5287, Princeton, NJ 08540; (609) 924-7111.

1st Base (DeskTop Software)	**INFOWORLD**	11/12/84	P. 55
1st Base (DeskTop Software)	**MACWORLD**	Jan. 85	P. 78
1st Base (DeskTop Software)	**INFOWORLD**	11/12/84	P. 55
1st Base (DeskTop Software)	**INFOWORLD**	12/31/84	P. 36

PFS®File and Report is a simple-to-use database management package. Those who are experienced with the PFS series on the Aple II will recognize the way in which this application is implemented. The basic idea is to prepare a data-input form that facilitates the creation of new records of information. Simple menus then allow for a variety of searching and reporting criteria. Software Publishing Corporation, 1901 Landings Drive, Mountain View, CA 94043; (415) 962-0191.

PFS:File	**MACWORLD**	Jan. 85	P. 81

OverVUE™ is an information manager for the Macintosh developed by ProVUE Development Corporation. (714) 969-2431 (Calif.). (NO FEEDBACK YET)

OverVUE	**A+ MAGAZINE**	Feb. 85	P. 89

Odesta Helix™ is an interactive information system made by Odesta. (800) 323-5423 or, in Illinois call (312) 498-5615. (NO FEEDBACK YET)

OMNIS 2 is a database program that will calculate, arrange, store, sort, and retrieve data. Database layout may have up to 9600 characters and up to 120 fields. Includes a report generator (compatible with MACWRITE). Organizational Software Corporation. (415) 571-0222 (Calif.). (NO FEEDBACK YET)

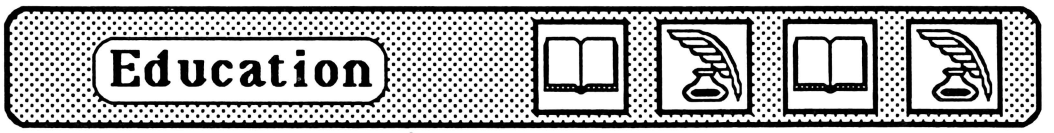
OMNIS 2	**A+ MAGAZINE**	Sep. 84	P. 7

Brock Keystroke Data Base by Brock Software Products, Inc. is an electronic file cabinet that enables you to store, find, update, or print information. Has its own report generator. (815) 459-4210 (Illinois) (NO FEEDBACK YET).

MegaFiler™ is a database program that handles mailing lists, multiple file access, integration with other Megahaus products, as well as the standard database functions. (619) 450-1230 (Calif.). (NO FEEDBACK YET)

DB Master is a very popular database that was first implemented on the Apple II series of computers. Available from Stoneware, Inc., 50 Belvedere St., San Rafael, CA 94901; (415) 457-1656.

DB Master	**MACWORLD**	Jan. 85	P. 85
DB Master	**INFOWORLD**	11/19/85	P. 57

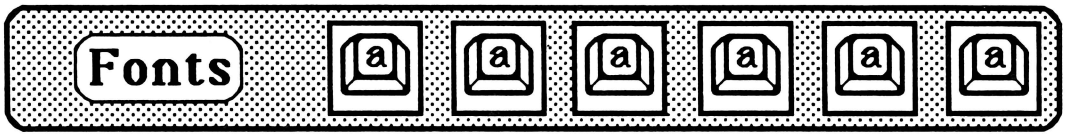


ChipWits is an application in which the user programs on-screen robots to do a variety of tasks in a variety of environments. In this manner, the user begins to develop some problem-solving skills. An icon-based language is used to let you run your programs, slow them down and debug them. In the process of solving some problems, the user becomes familiar with some simple programming concepts (branching, subroutines, agruments). Price: $49.95 Vendor: Brainworks, Inc., 24009 Ventura Blvd. #250, Calabasas, CA 91302; (818) 884-6911. (NO FEEDBACK YET).

Solar System helps to teach the user about the planets in our solar system. There is a real-time graphics display of the system that illustrates some of the relationships between the planets. If you "click" on one of the planets, some factual information is displayed on the screen. After viewing the display and examining the information, tests may be taken on the concepts presented. Price: $27.95. Vendor : Millet Software, 146 West 255 South, Orem, UT 84058; (801) 224-6841. (NO FEEDBACK YET)

Adventure I Series is a set of **interactive fiction** programs designed for second-grade and third-grade students. In **Reading Adventure I** , students choose their own story lines and get points for improving their comprehension skills. In **World Geography Adventure I**, students learn to identify countries, capitals, large cities, and major rivers (North and South America). In **How a Bill Becomes A Law**, the student is a member of Congress who is trying to get a bill passed and thus learns about the legislative process along the way. In the **American History Adventure**, the student meets characters from history and must identify the person, the time, and the place. Price: $39.95 -$59.95. Vendor: Quesu, 5 Chapel Hill Dr., Fairfield, CT 06432; (800) 232-2224 or, in Connecticut (203) 335-0908. (NO FEEDBACK YET)

MacEdge II™ is an educational skill-building program. Includes eight applications on one disk: Count on Mac; Good Times; Word Wonder; Dividing Line; Memory Match; Additional Subtraction; A Li'l Give 'n Take; and Give 'n Take. A good package for teaching introductory concepts of arithemetic. Features use of mouse or keyboard, four voice synthesizer, animated graphics, and progressive skill-building. Six programs allow four player participation. Vendor: Think Educational Software, Inc., 16 Market St., Box 466, Potsdam, NY 13676-0466; (315) 265-5636. (NO FEEDBACK YET)



Fluent Fonts provides dozens of fonts for use in your word processing applications. Two-disk set is $49.95 from Casady Company P.O. Box 223779, Carmel, CA 93922; (408) 646-4660. (NO FEEDBACK YET)

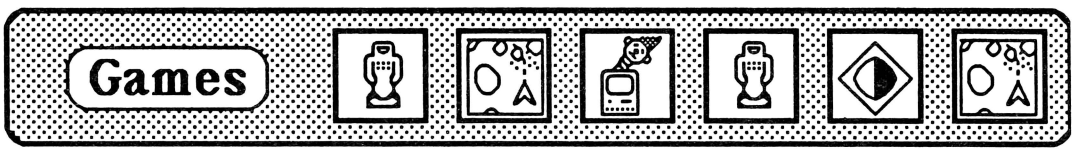
Soft Palette Font (Volume 1) contains a collection of 18 decorator fonts. There are borders and interior design symbols. Price $35. Vendor: Decision Science Software, Inc., P.O. Box 7876, Austin, TX 78713; (512) 926-4527. (NO FEEDBACK YET)

Professional Type Fonts comes with two disks. One disk contains fonts for text and the other contains fonts for headlines. These are modeled after the famous Mergenthaler and ITC typefaces (Times, Helvetica, Roman, and Optima). Sixteen fonts are provided in sizes from 12 point to 24 points (the headline fonts are larger). You need a 512K Macintosh. Prices: Text Fonts - $49.95; Headline Fonts - $69.95. Vendor: Kensington Microware Ltd., 251 Park Ave. S., New York, NY 10010; (212) 475-5200. (NO FEEDBACK YET)

Dayton Math Fonts contains four math fonts (over 700 characters) that are suitable for use in preparing technical manuscripts. Included are all of the standard mathematical symbols, a Greek alphabet, fractions, Greek and Roman alphabets (with tildes, bars, and carets), special integrals, summations, and much more. Price $29.95. Vendor: Plugh, Inc., 595 Royal Springs, Springboro, OH 45066; (513) 748-2423. (NO FEEDBACK YET)

UltraFonts is a disk with some new fonts for the Macintosh. There are two new packages. (1) Technical and Business Fonts features a variety of fonts for engineers,

scientists, doctors, and lawyers. There are more than 100 symbols (two Greek language fonts, math symbols, correspondence quality text) Available March 15, 1985. (2) UltraFonts Edition Two features 21 fonts in sizes ranging from 6 point to 36 point. There is a borders font, symbols font, international symbols, Macintosh Icon font, and more. Price: $29.95 each or both for $49.95. Vendor : 21st Century Software, Malon Products, Inc., 2306 Cotner Ave., Los Angeles, Ca 90064; (213) 829-4436. (NO FEEDBACK YET).



Ground Zero will be familiar to those who know the arcade game called MISSILE COMMAND. You must destroy missiles that are heading for several cities than you are protecting. Play gets fast and furious as your own skill improves. Lots of fun for video game addicts. The best scores are recorded on disk for posterity.

Sargon III is a great way to play chess. It is however, not easy to beat SARGON (turning off its opening-move library and selecting easy play gives you a fighting chance). The special features of this implementation (windows that track moves, instant replay, move retraction, libraries of openings and closings, piece movement using the mouse rather than notation, and much more) make this the best chess game around. Great for learners or experts.

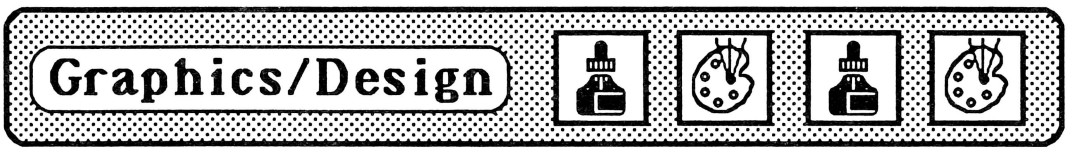
Trivia asks a lot of difficult questions and lets you know how you are doing along the way. The program is really a master of ceremonies. You don't enter the answer, you say it aloud and then ask Trivia to display the correct answer. Players in the game decide if your answer is close enough. There is a General Knowledge disk with 5,000 questions. You can be timed, prevent certain categories from being continually selected, and play at various skill levels. The five categories are entertainment, sports, geography, history, and literature. You can make up your own questions and answers if you wish (lots of potential with this). Price: $49.95 Vendor: Mirage Concepts, 4055 W. Shaw #108, Fresno, CA 93711; (209) 227-8369.

Through the Looking Glass used to be the game called ALICE. It is a program that was developed at Apple Computer during the early stages of the Macintosh project. You may have an early version of the game. The latest (and legitimate release) of the program is much better than the original. The basic idea is that you select a chess piece that you (in the role of Alice) then become. A game of real chess is played with no delay between moves. It's just you against the other player (Mac). This is a fast game! The new release has several versions, including mutations, erosion, Mirror-Mouse, and Upside Down! In addition, you can create your own pieces so that the game becomes more "personalized". Lots of fun with this one. Price: $39.95. Vendor: Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014; (800) 538-9696 or (800) 662-6238.

Through the Looking Glass	**MACWORLD**	Mar. 85	P. 85

Articles on Miscellaneous Games

Transylvania (Adventure game)	**A+ MAGAZINE**	Sep. 84	
Millionaire (Investment game)	**A+ MAGAZINE**	Sep. 84	
MacSlots (Slot Machine)	**MACWORLD**	Nov. 84	P. 80
MacJack (Blackjack)	**MACWORLD**	Nov. 84	P. 80



Microsoft Chart is a business graphics package from Microsoft. It integrates well with Multiplan, Word, and File (other Microsoft products). This is an excellent package for creating and drawing graphs either by directly entering the raw data or by transferring it from a spreadsheet. The user can choose from bar charts, column charts, area charts, line graphs, pie diagrams, scatter diagrams, and combinations. Various statistics can be performed on the data (and created as a separate series). It is possible to plot a linear regression line of the data as well as an exponential growth curve. The final chart can be extensively enhanced with legends, titles, shadings, text, scaling and a wide variety of other techniques. This is easy to learn and quick to use. Should be part of your library. Microsoft Corporation, 10700 Northup Way, Bellevue, WA 98004; (800) 426-9400.

Microsoft Chart	MACWORLD	May-Jun. 84	P. 72
Microsoft Chart	INFOWORLD	1/14/85	P. 56
Presentation Graphics on the Macintosh by Lambert (Microsoft)			

Slide Show™ Magician takes your MacPaint documents and arranges them into a slide show presentation. Anything you can put on a Mac screen can be used in the slide show. You can control how long each frame stays on the screen or even let the show run continuously. There are 16 movie-type special effects. These include wipes, curtains, fades, and much more. This is a very easy package to use and really does allow you to create "magical" slide shows. You can place "buttons" on your slide, add text, animate text, use the mouse to point and click, and even let your "shows " be sent to someone else for running on their computer (even if they do not have Slide Show™ Magician). Many vendors use this product to display their products' features to potential customers. It may be a good addition to your software library Price: $59.95. Vendor : Magnum Software, 21115 Devonshire St. Suite 337, Chatsworth, CA 91311; (818) 700-0510.

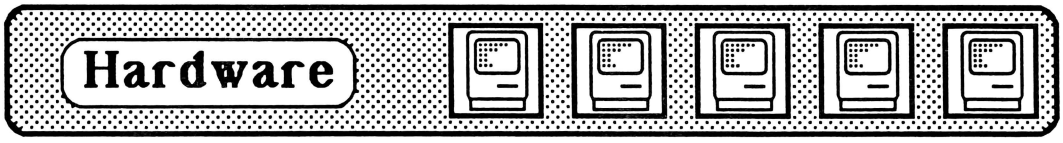
ClickArt™ is a collection of picture disks. At present, there are three disks: (1) Personal Graphics (people, cartoons, arrows, and miscellaneous), (2) Publications (3-column layout guides, borders, maps, letterhead, and more), and (3) Letters (24 large alphabets). **Watch for a Special Effects disk to be released soon that will rotate text, slant words, add perspective, and/or distort images.** Vendor :

T/Maker Graphics, 2115 Landings Drive, Mountain View, CA 94043.

ClickArt Pictures **INFOWORLD** 8/13/84 P. 61

Buildings. Hayden Software Company has several Macintosh picture disks available for doing some very thorough designing. These are not merely "cilp art" but rather "structural pieces" that can be assembled into buildings, landscapes etc. Currently available are daVinci : Buildings; Building Blocks; Commercial Interiors; Interiors, and Landscapes. These can be quite valuable tools to those in the field. Vendor : Hayden Software Company, 600 Suffolk Street, Lowell, MA 01853; (617) 937-0200.

MouseAround™ is a drawing tool that you insert the mouse into that gives you crosshairs to facilitate drawing or tracing a picture. It is a 12" by 12" plastic drawing surface board with a built-in mechanism for holding the mouse. Gives greater control over the mouse. FrontRunner Computer Industries, 316 California Ave, Suite 712, Reno, Nevada 89509; (702) 786-4600. (NO FEEDBACK YET)



ThunderScan™ is a hardware attachment that can take any printed image into a detailed, high-resolution Macintosh graphic. The ThunderScan™ turns the ImageWriter into an image reader. You replace the ribbon cartridge with this device. The device is a scanner than will scan any image you can roll into the printer and send it to the Macintosh You can enlarge an image up to 400 percent or shrink it 25 percent. The device is easy to set up, focus, and use. The software is well-written, MacPaint-like in its design, and even incorporates a new auto-scrolling feature when viewing a large picture. When the scanning is done (unusually fast), the grat scales have been retained. You can then adjust the brightness and/or contrast to your liking. This is a great product. If you have any plans to transfer images from magazines, pictures, photographs or what have you, then you will be quite pleased with ThunderScan. Price: $229. (415) 254-6581 (Calif.).

Mac•Turbo•Touch by Assimilation Process is a track ball input device for the Macintosh. It can be used instead of the mouse or right along with it (the mouse plugs into the back of the Turbo Touch. There are two buttons on the Turbo Touch and a track ball that gives surprisingly good control over cursor movement on the screen. Not great for fine drawing but certainly a faster way to move the cursor around the screen. Does not take very long to get used to. Since it is stationary, it may be just what you want. Try one out at your dealer. Price: $129. (800) MAC-5464 or, in California (800) 421-0243 or, in (408) 446-0797.

Mac Turbo Touch	**A+ MAGAZINE**	Apr. 85	P. 72

MacStation™ by MicroRain makes a stand with storage space for the Macintosh, ImageWriter, and External Disk drive. (800) 547-4000, Dept . 410 or, in Oregon or outside the U.S.A. (503) 684-3000, Dept. 410. (NO FEEDBACK YET)

MacDrive™ by TECMAR, Inc. can be a 10-megabyte fixed hard disk or a 5-megabyte removable hard disk (with an option of adding 5 more megabytes). Phone : 216-349-0600 (OHIO) (NO FEEDBACK YET)

OmniDrive™, a network ready hard disk, is made by Corvus Systems, Inc. Cost is $1,795 for the 5.5 megabyte model. (408) 559-7000 (Calif.). (NO FEEDBACK YET)

Hard-Disk Drives	**A+ MAGAZINE**	Dec. 84	P. 116
Hard-Disk Drives	**MACWORLD**	Dec. 84	P. 70
Hard Disk Drives for Mac	**POP. COMPUTING**	Apr. 85	P. 100

Hyperdrive™ is a hard disk that is built into your Macintosh. It stores 10 MB of data, is extraordinarily fast, and is certainly an enhancement that every 512K Macintosh should have. It transfers data at a 5-Mbit-per-second rate -- up to seven times faster than external drives. Files can be divided up into 32 drawers of any size you wish. Resizing takes place automatically. Works quite well with the Macintosh Finder. More on this product next issue. General Computer Company, 215 First Street, Cambridge, MA 02142; (800) 422-0101. Consortium pricing available.

Hyperdrive Hard Disk	**A+ MAGAZINE**	Mar. 85	P. 15

The Keeper™ is a hard-disk system made for the Macintosh by Micro-Design of Austin, Texas. Built-in printer buffer; runs four to six times faster than floppies. Add up to 33 megabytes of storage. (800) 531-5002 or, in Texas call (512) 441-7890. (NO FEEDBACK YET)

The Bernoulli Box™ is a cartridge disk system made by IOMEGA Corporation of Utah. Has 5-megabyte removable cartridges. (800) 556-1234, x215 or, in California (800) 441-2345, x215. (NO FEEDBACK YET)

Composite Video Adapter from Mentauris connects the Macintosh to a wide range of commercial video monitor and projection equipment. (512) 396-1565 (Texas). (NO FEEDBACK YET)

MACQUISITION™ is a set of tools for collecting and logging data from laboratory instruments and industrial sensors. The user can define an application using a simple spreadsheet (right now Multiplan) template. Data is then automatically collected, analyzed, charted, and reported. Macqisition™ uses the Taurus One/05 data acquisition

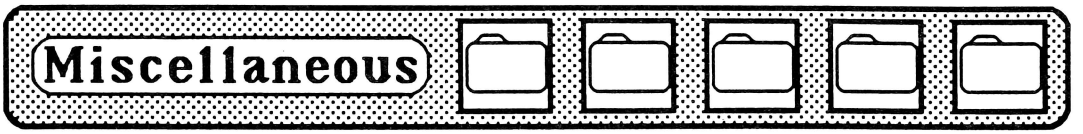
and control peripheral. This unit interfaces with a wide variety of signals, including **analog input, digital input/output, analog output, and counters**. (There are 16 Analog Input Channels and 16 Digital Input/Output Channels.) The unit offers 12-bit resolution on analog inputs and outputs with analog input gains from 1 to 1000. Systems begin at $2,595 without a Macintosh and can be configured with a variety of options. Contact the vendor directly for information about pricing, discounts, multiuser systems, and the like. We have seen this unit demonstrated and it looks preety nice. There will be a more extensive review with feedback from some Consortium test sites in the near future. Small Business Computers of New England, 4 Limbo Lane, P.O. Box 397, Amherst, NH 03031; (603) 673-0228.

MouseHouse™ is, quite simply, a **holder for the Macintosh™ mouse**. It is used when the machine is not in use. It attaches to either side of the Macintosh with removable velcro strips. The MouseHouse™ matches the color and contours of the mouse and looks like an integral part of the machine's exterior. Suggested retail price is $5.95. Contact FrontRunner Computer Industries, 316 California Ave, Suite 712, Reno, Nv. 89509; (702) 786-4600.

Print 'n Switch™ allows you to use both an ImageWriter and a letter-quality printer with your Macintosh. It plugs into the printer port on the rear of the machine (leaving the modem port free to be used by other peripherals). The ImageWriter and letter-quality printer plug directly into a small Print 'n Switch box. At the press of a button, either printer is activated. Works with most letter-quality printers. Price: $119.95. FrontRunner Computer Industries, 316 California Ave., Suite 712, Reno, Nv. 89509; (702) 786-4600. (NO FEEDBACK YET).

MacEnhancer™ gives Macintosh users ability to **connect to additional peripherals**. It adds one IBM-type connector for parallel printers, two IBM-type connectors for serial printers, modems, and host connections. The package includes printer-driver and terminal-emulation software. Supports almost all dot matrix printers, but only the Epson LQ1500 and Toshiba P1351 letter-quality printers at present. Price: $249. Microsoft Corporation, 10700 Northup Way, Box 97200, Bellevue, WA 98009. (NO FEEDBACK YET).

MacEnhancer **A+ MAGAZINE** Mar. 85 P. 82



Scientific Analysis Program is used to solve both numerical and statistical problems. You need to have Microsoft BASIC in order to use this application. With the two disks provided, the user can solve linear, nonlinear, complex, and sets of simultaneous differential equations. In addition, the program does linear regression and curve fitting, calculates definite integrals, and solves matrix equations. Price: $35.

Vendor: PCA Software, P.O. Box 1231, Arlington, TX 76010; (817) 860-5498. (NO FEEDBACK YET).

MusicWorks is great fun. Certainly best for those skilled in music. However, anyone can learn to use this program and have a good time. You can edit, compose, and then play your music. This can be done in MacPaint-like fashion on a predesigned staff or you can use a facsimile of a piano. There are four voices available, 10 instruments, and a variety of playing styles. Lots of "data disks" of music are appearing at user Ggoup meetings and as freeware. When your Macintosh is connected to an external speaker (via the built-in audio jack), it really sounds great. Price: $79.95. Vendor: Hayden Software, 600 Suffolk St., Lowell, MA 01854; (800) 343-1218. (NO FEEDBACK YET)

SongPainter is a music program that comes with built-in chords, scales, and an orchestra of instruments. The user can combine instruments, pitch, rhythms, and chords using a unique picture-painting scheme. There are some special effects, as well as accents for rhythm, adjustable tempo and volume, and a Help screen (when needed). Vendor: Rubicon Publishing, 6300 La Calma Dr., Suite 100, Austin, TX 78752; (512) 454-5004. (NO FEEDBACK YET)

MAC•MEMORY•DISK™ by Assimilation Process lets you allocate a portion of the RAM resident in your 512K Macintosh and treat it like a disk. Significantly increases the speed of many applications. Price: $29 (800) MAC-5464 or, in California (800) 421-0243 or, in Canada (404) 446-0797.

Mac Memory Disk **A+ MAGAZINE** Mar. 85 P. 86

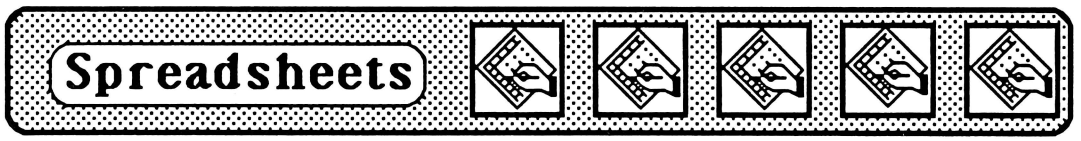
MacLabeler helps you keep track of what is on your disks. This application creates labels that will automatically list up to 20 names of files on your disk on the label. You can choose whether a file is included on the list or not. A helpful utility. Price $49.95. Vendor: Ideaform Inc., P.O. Box 1540, Fairfield, IA 52556; (515) 472-7256. (NO FEEDBACK YET).

MaCalendar™ by Videx, Inc. is a time management tool. It combines the alarm clock with a calendar with a note pad. It can be installed as a desk accessory and be available whenever you need it. IAttractive and easy to use, as with many products, this one is only useful if you are disciplined enough to keep entering your appointments and regularly check on their status in the Macintosh. Price: $89. (503) 758-0521.

P/C Privacy is a data encryption system that protects your text or graphics files from being viewed by others. The user "decodes" an encrypted file by entering a key word, which can be changed. Price: $140. Vendor: MCTel, Inc., 3 Bala Plaza E #505, Bala Cynwyd, PA 19004; (800) 628-3584 or, in Pennsylvania (215) 668-0983. (NO FEEDBACK YET)

SmoothTalker™ is an exciting new product that converts plain English text, from either the keyboard or a MacWrite text document, into high-quality and natural sounding speech. Mouse-driven commands allow you to specify the speed, pitch, tone, and volume of both a male and a female voice. A dictionary can be created with words that

SmoothTalker doesn't speak particularly well. Several software developers are incorporating this product into applications that will soon reach the market. A demonstration is available 24 hours-a-day by calling (714) 536-0086. The technology can be obtained in two ways: (1) as a stand-alone retail product, and (2) as licensable software modules for the developers and universities that can be embedded within the author's own programs. Some changes currently under way include enhanced phonetic capability, faster conversion, and use as a "driver" from other language programs. First Byte, 2845 Temple Avenue, Long Beach, CA 90806; (213) 595-7006 or, in California (800) 624-2692 or, in the remainder of the U.S. (800) 523-8070.



Multiplan by Microsoft is a spreadsheet that is unusually easy to use. This application takes great advantage of the Macintosh user interface. It is a very powerful spreadsheet with many built-in functions. Microsoft Corporation, 10700 Northup Way, Bellevue, WA 98004; (800) 426-9400.

Multiplan	**MACWORLD**	Apr. 84	P. 72
Investing with Multiplan	**MACWORLD**	Apr. 84	P. 94
Multiplan and Chart	**MACWORLD**	Sept./Oct. 84	
Multiplan	**MACWORLD**	Dec. 84	P. 142

Multiplan Made Easy by Ettlin (Osborne/McGraw-Hill)

MacTerminal is data communications software from Apple that, when used with a modem, allows the Macintosh to emulate other data terminals (IBM 3278, DEC VT100, DEC VT52™, and TTY). Access can be obtained to a variety of electronic information services and data can be easily transferred back and forth between your microcomputer and a mainframe. Available from Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; (800) 538-9696.

MacTerminal	**MACWORLD**	July/Aug.	P. 64

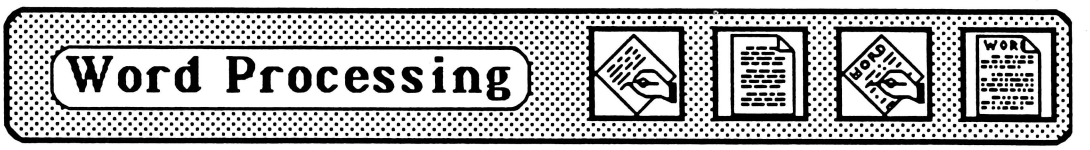
Mac Telecommunications by Erickson/Sayre (Osborne/McGraw-Hill)

Apple Modem is a hardware product available from Apple for use in making the telephone link between your Macintosh microcomputer and a mainframe. Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014; (800) 538-9696.

Apple Modem/MacTerminal	**A+ MAGAZINE**	Mar. 85	P. 118
Apple Modem 1200	**MACWORLD**	July/Aug. 84	P. 64

Mac•DaisyWheel•Connection™ by Assimilation Process can tie the Macintosh to the Apple DaisyWheel Printer, the Brother (HR series), the C-Itoh (Starwriter), the Daisywriter, the Diablo, the NEC Spinwriter, and the Qume (Letterpro and Sprint II Series). This is a very easy program to learn tand it works well. Price: $99 (800) MAC-5464 or, in California (800) 421-0243 or, in Canada (408) 446-0797.

NEC Information Systems, Inc. matches the Macintosh with a Spinwriter printer. (800) 343-4419 or, in Massachusetts call (617) 264-8635. (NO FEEDBACK YET)



Mac•Spell•Right by Assimilation Process helps correct spelling and provides a Thesaurus for your use. Works only with the new Disk-Based MacWrite (not yet released by Apple!). Easy to use. Price: $89 (800) MAC-5464 or, in California (800) 421-0243 or, in Canada (404) 446-0797.

Mac Spell Right	**A+ MAGAZINE**	Feb. 85	P. 100

Hayden: Speller is a spelling checker program that works with either MacWrite or Microsoft Word. It is not neccesary to switch back and forth between your application and the spell checker. Its dictionary contains over 22,000 entries; you may also create dictionaries of your own. Price: $79.95 Vendor: Hayden Software, 600 Suffolk St., Lowell, MA 01854; (800) 343-1218. (NO FEEDBACK YET)

ThinkTank™, an idea processor produced by Living Videotext, Inc. in Mountain View, California, provides an outline format for you to "arrange your ideas." Great for preparing outlines of research papers, reports, articles, or to-do lists. This is not a full-fledged word processor and does not (as far as we know) interface with one (such as MacWrite). (800) 556-1234, x213 or, in California (800) 441-2345, x213. (NO FEEDBACK YET)

MegaMerge™ works with MacWrite to provide the ability to create and merge mailing lists with documents, print mailing labels, and chain documents together so they print as one long document. Available from Megahaus. (619) 450-1230. (NO FEEDBACK YET)

Microsoft WORD is a very powerful word-processing program from Microsoft Corporation. It seems to have some significant advantages over the current versions of

MacWrite. Additional information and product comparisions will appear in the next issue.

Word	**MACWORLD**	July/Aug. 84	P. 64
Microsoft WORD Made Easy by Hoffman	(Osborne/McGraw-Hill)		

MacWrite is a word-processing application from Apple Computer designed for the Macintosh. A new version, to be released shortly, improves greatly on the performance of the original product. When it is a released product, we will cover it in depth in this section.

MacWrite	**MACWORLD**	Apr. 84	P. 62
MacWrite & Foreign Documents	**A+ MAGAZINE**	Oct. 84	P. 129
MacWrite Version 3.3	**A+ MAGAZINE**	Feb. 84	P. 100
Using MacWrite and MacPaint by Field	(Osborne/McGraw-Hill)		

LISA MATERIAL

LisaCalc	**A+ MAGAZINE**	Jan. 84	P. 56
Lisa 7/7 Integrated Office System	**A+ MAGAZINE**	Sept. 84	
LisaProject	**A+ MAGAZINE**	Sep. 84	
Lisa Applications	**A+ MAGAZINE**	Aug. 84	

GRAPHICS MATERIAL

McPIC (Pictures)	**INFOWORLD**	8/13/84	P. 61
MacPaint (Drawing/Art)	**MACWORLD**	Apr. 84	
	POP. COMP.	Nov. 84	P.90
MacDraw Scaled Drawing	**MACWORLD**	Sept. 84	P. 51
	MACWORLD	Nov. 84	P. 115
Elements of Graphic Design	**MACWORLD**	Feb. 85	P. 122

GENERAL INTEREST

A MacCopy Program	**A+ MAGAZINE**	Oct. 84	P. 131
Mac Criticisms	**A+ MAGAZINE**	Oct.. 84	P. 141
The Mac Makes Music	**A+ MAGAZINE**	Aug. 84	
Should Students Buy a Computer?	**POP. COMPUTING**	Oct. 84	P. 115
A Look At Micros on Campus	**POP. COMPUTING**	Oct. 84	P. 118
The 512K Macintosh	**MACWORLD**	Nov. 84	P. 56

Behind the Finder	**MACWORLD**	Nov. 84	P. 135
Playing Games on the Mac	**POP.COMPUTING**	Dec. 84	P. 29
Macintosh Software	**PER.COMPUTING**	Dec. 84	P. 110
Future of the Micro	**POP.COMPUTING**	Jan. 85	P. 89
Products From Reed College	**BYTE**	Jan. 85	P. 415

MACINTOSH RELATED BOOKS

The Easy Guide To Your Macintosh by Joseph Caggiano
Sybex Books: Berkeley

Using & Programming The Macintosh by Frederick Holtz
Tab Books, Inc: Blue Ridge Summit, PA

MacWork MacPlay by Lon Poole
Microsoft Press: Bellevue, WA

The Apple Macintosh Book by Cary Lu
Microsoft Press: Bellevue, WA

Macintosh For College Students by Brian Pfaffenberger
Sybex Computer Books: Berkeley, CA

The Macintosh by Bill O'Brien
Bantam Books: New York

Introducing The Macintosh by Duff
McGraw-Hill

This section of **WHEELS FOR THE MIND** contains hints, tips, and techniques gathered from software authors, vendors, users, publications, user groups, and just about anywhere else. Items from the previous issue are in **smaller type.** Items older than one issue have a title and issue reference only. New items appear in the **larger type.** If you have tips to share, please send them along to the Editor: Peter Olivieri, Computer Sciences, Boston College - Fulton 430, Chestnut Hill, MA 02167.

MACPAINT™

Many thanks to MacPaint author Bill Atkinson, who provided information about these great MacPaint tips.

CONSTRAINING IS A GREAT TOOL. When you use the Shift key in conjunction with some of the tools in MacPaint, the results can be quite impressive.

Shift -pencil while in Fat Bits will help you fill in straight lines, both vertically and horizontally. I'll bet everyone has tried it freehand at one time or another with little success.

Shift -eraser allows you to erase areas without "wandering" into other areas of your drawing that you want to leave untouched.

Shift - paint bucket gives some great effects. Try using the "fence" brush shape with Shift key and you'll get some nice borders.

Shift - hand can be used to move the screen up and down (or left and right) without straying from your intended course. This also works quite nicely in Show Page mode.

Shift - rectangle makes perfect squares.

Shift - oval makes perfect circles.

FAST FATBITS. If you have pencil selected, hold down the ⌘ key and click your pencil cursor at the spot where you want FatBits to be displayed. This is an amazingly fast way to get in and out of FatBits. It is much better than double-clicking or using the menu to do this.

MULTI-COPY (holding down the ⌘ and Option keys while dragging) has some interesting features. They are best explained with a demonstration, so please sit down at a Macintosh and try these.

DOTTED LINES AND CIRCLES. Select a line width that is fairly large. Select a brush shape that is a dot (not too big a dot). Use the tool to place a dot on the screen. the dot. Use the Multi-copy technique to draw a dotted line. Try making a dotted circle.

Shift with the Multi-Copy technique does some neat constraining. Try this: Draw a rectangle with a decent-size border. Suppose the rectangle is not quite long enough. Use the icon to select the right half of it; use Shift with Multi-Copy to stretch the rectangle to the right. Better yet, try this: Fill in the rectangle with a "noisy" pattern of your choice. If you now try the Shift Multi-Copy technique (preceding), the pattern will not "stretch" correctly. Do not despair. Go to the Goodies menu and select Grid. Now try the Shift Multi-Copy method, and the pattern will copy as well. Try this, you'll like it! Bill Atkinson calls this technique the "three-finger stretch."

UNDO is much easier if you use the upper left key on the keyboard. That's right, it works just like the menu item for Undo but lets you react faster.

TRANSPARENT PAINT is a neat effect. Try the following. Paint several stripes on the screen. Paint another color across them. Notice that the last stripe painted is opaque. Now hold down the ⌘ while painting another stripe . . . you get transparent paint. If you select the filled-in tool, you can even draw a background "behind" what is on the screen. This technique also allows you to paint near curved or straight lines without spilling over onto the line itself. (You've all done that!) Try these. . .you'll be impressed.

PATTERN GRABBING. Let's suppose that a friend gives you a disk that has some neat patterns on it that you'd like to have. You really don't want to go to the trouble of editing a pattern in detail. Try this: Paint the pattern of interest onto the screen somewhere. Double-click on a pattern in the pattern palette that you won't mind replacing. When the "pattern edit" box appears, move to your document and just click somewhere on the pattern you like. That's it! It's yours!

TYPING TEXT. Sometimes when you're in text mode you would like to change styles (perhaps do something in bold). However, when you click the mouse to change styles and then click again to start typing, you often can't easily line up the typing so it looks continuous. If you press Enter instead of clicking, all your typing will be on a straight line.

SAVING MACPAINT SPACE. If you have a lot of MacPaint pictures, you may be using a lot of space on your disk. If some of your "drawings" are not a full page, you can get some of your space back. The technique is to "combine" some of your pictures. If you get two pictures on a single document, you will save about 2K per document. It adds up!

MACPAINT 1.4 BUG. When using MacPaint Version 1.4 on a 512K Macintosh, you can crash the application with a system error if you use Show Page after opening an old document. You can get around this problem by opening MacPaint from the Desktop and then using the "Open" command to get at the document of interest.

QUICK EXIT. Lots of current users are leaving MacPaint the fast way: Hold down the ⌘ key while choosing Quit from the file menu. The disk ejects, the tone sounds, and the Macintosh reboots. However, you really shouldn't use this method, as it doesn't guarantee that your disk directory will be in perfect order.

Double-Click on any pattern and you can edit/create your own pattern.

Double-Click on the ✋ icon and the full page is displayed.

MOVING OBJECTS . If you use the ⌾ icon to move and copy objects, the "white background" that follows when you use the ⬚ icon stays behind. This is especially useful when overlaying one picture onto another. In effect, the ⌾ captures only the object that is selected.

PLACING OBJECTS ON TOP OF OTHER OBJECTS. If you wish to make an item transparent (say the lenses in a pair of eyeglasses), leave a little break in the frames where the lenses are. Using the ⌾ icon will allow you to capture only the "borders" of the frames and allow the final object to look like real eyeglasses (that is, you can "see" through them). Try this to get the full effect. If you wish, you can then use FatBits to "repair" the breaks in the frame.

MAKING AN EXACT COPY OF AN OBJECT. After you select an object with the ⌾ icon or the ⬚ icon, you can make an exact copy by holding down the Option key, pointing to your object (make sure an arrow appears), pressing down the Mouse Button, and then dragging to a new location. Letting up on the button places your copy on the page. You can continue making as many copies as you wish.

MAKING MULTIPLE COPIES OF AN OBJECT. You can make Repeating Copies (a nice effect) by selecting an object with the ⌾ icon or the ⬚ icon, holding down both the Option key and the ⌘ key, pointing at the object until an arrow appears, and then dragging the mouse while holding the button down. Interesting Note: The current line width determines how much space will be between repeating copies as you do the dragging. Try some different line widths to get a feel for this.

STRETCHING AN OBJECT. Select the object, using the ⬚ icon. Hold down the ⌘ key and point to one of the edges of the enclosed figure. When an arrow appears, hold down the Mouse Button and drag the enclosed area left or right (maybe up or down) and watch your object stretch!

ENLARGING AN OBJECT. When you Paste an object onto the screen, it returns at the same size that it was Cut (or Copeid). You can cause it to return as a larger or smaller image than the original. Before you paste, use the ⬚ icon to place a border rectangle on the screen. Make the size of this rectangle equal to the size you would like your object to be. When you now use the Paste option, your object gets resized accordingly.

CHANGING FONTS AND TEXT SIZE. Sometimes it's awkward to use the mouse and menu system for changing font styles or type sizes. If you hold down the ⌘ key , the Shift key, and then press > you will automatically call the next font. Each time you press > you will call another font. To try different text sizes, just hold down the ⌘ key while you press >. After trying this for a bit, you may prefer to use this technique all the time.

AUTOMATIC MACPAINT DOCUMENT. If you hold down the ⌘ key and the Shift key and then press the number 3, the current screen will be saved as a MacPaint document called SCREEN0. (You can save 10 such "paintings.") That drawing is now available to you in MacPaint. This allows for some very creative applications.

NO BORDERS. If you select the dotted line from the Border Palette, your filled rectangles and circles will have no outline.

HIDDEN FEATURE. Select a drawing with the ⬚ icon and hold down the Shift key. Select Trace Edges from the Edit menu and your drawing will now have a shadow.

CUSTOM PATTERNS. If you create a MacPaint document that contains several boxes with various patterns that you designed, you can easily call them up while drawing and transfer them to your Pattern Menu at the bottom of the page. Just use Cut and Paste to transfer a pattern from your MacPaint pattern collection to the pattern you wish to edit.

TRANSPARENT PAINT. If you have version 1.3 of MacPaint, you can paint with transparent paint. Hold down the ⌘ key and use the , , or .

CATALOGS. In the Goodies menu, there is a Print Catalog selection. Using this command, you can get a one-inch-square "picture" of all of the MacPaint pictures on your disk. It makes a handy reference.

MACTERMINAL ™

The following keystroke combinations may be of interest to users of MacTerminal:

- ⌘ H Backspaces cursor one space
- ⌘ I Moves cursor to right to next Tab
- ⌘ J Moves cursor down one line
- ⌘ K Moves cursor down two lines
- ⌘ M Moves cursor back to start of line
- ⌘ G Causes tone to sound

MACWRITE™

CHARACTER ACCENTS. To use an accent, umlaut, and other characters in conjunction with letters, do the following: First press the key combination that produces the special character (look at Key Caps to see what combination is required), then type the letter you want in that same position. The ^ and the ' work only with the lower-case vowels. The also works with E. The ~ can be used with a, o, n, and N. The ¨ works with lower-case vowels and upper case A, O, and U.

IMAGEWRITER SWITCHES can control your printer in a variety of ways. There are two sets of switches on the ImageWriter. The first set, called SW1, controls some of the features of draft mode printing. SW2, the second set, has switches that can cause irregularities in your printing if they are not properly set. If you want to use a foreign language set for draft printing, you can change the switches marked 1, 2, and 3. The settings for different character sets can be found in your ImageWriter user's manual (page 44). The pitch can also be modified with switches 6 and 7 (see page 41).

SW2 has three switches that will affect printing in any resolution if not correctly set.

Switches 1 and 2 control the baud rate. MacWrite and Multiplan® both need 9600 baud (both switches closed -- see page 39). Switch 3 controls the XON/XOFF protocol. If the setting is not correct, you will get a dialog box that says "Printer Is Not Responding."

DOUBLE LINES can be created in MacWrite by choosing Underline from the style menu and then typing with the underscore character (SHIFT -). To get the "double line" under words, you must enter a double line for a few spaces, then begin typing your words, and then end with your double lines again. This feature does not work as yet, on the LaserWriter printer.

NEW MACWRITE VERSIONS. There are several versions of MacWrite floating around the user community. These are generally labeled 3.935678999 or something like that. Be advised that they are prerelease versions and can cause some problems. Cautious users will use a released version of MacWrite until the final update is released. Old MacWrite documents need to be converted to work with Version 3.9. It is done within MacWrite. Converted versions no longer work under an earlier MacWrite version. You can, however, cut some material out of a 3.9 version. Quit the application. Start up an older MacWrite version and paste your material wherever you like.

MACWRITE DOCUMENT SIZE. A MacWrite document on a 128K Macintosh is limited to about 27,000 characters. This is nearly 5,000 words or 20 double spaced pages in 12-point type size. (1) If you use a lot of fancy fonts and graphics in your paper, you won't be able to have as many pages. (2) With a 512K Macintosh, you have about 80 double-spaced pages (about 20,000 words) to work with.

QUICK ERASING. To erase some text, select it in the usual way and press the Backspace key. It's gone! You may prefer to use Cut or Copy if the text will be used again. Another alternative is to select the text and begin typing the new material. The new material will automatically replace all of what you "selected."

SAVE SOME MACWRITE SPACE. On your MacWrite disk, put the Sample Memo in the trash (saves 3K). Even more space can be saved if you remove fonts that you really never expect to use. This can be easily done by using the Font Mover application. Be careful not to remove any of the System Fonts.

SAVE MORE MACWRITE SPACE. If you save your documents without special fonts, rulers, and pictures, you can save up to 30 percent of the space consumed by that document. Thus, until you're ready for final copy, you might consider saving your documents as Text Only. This is one of the options in the Print Dialog box.

SAVE PAPER. When you get the dialog box for printing, fill in the requests for beginning and ending page numbers. (1) The last page will not be ejected from the printer. (2) No blank pages will be printed.

REPLACING DELETED LETTERS. Ever use the Backspace key to erase letters and wish you had them back? Try using the ⌘ key together with the Backspace key and the letters will return. (The cursor will even move forward.)

SAVE SELECTION TIME. To select large areas of a document, click at the starting point, use the scroll box to find the end point for the selection, hold down the Shift key, and click again. The whole area is selected. This is called shift-clicking and is not known by many MacWrite users.

FAST WORDS. Select an entire word by doing a Double-Click on it.

WIDER PAGES. You can have a right margin that extends past the 7 1/4-inch mark. Grab the title bar of your document and move the window a few inches to the left. Then use the size box to make the window wider on the right side. You can then extend the right margin marker.

HOW BIG IT IS. Sometimes you might want to know how much memory you have left for your MacWrite document. If you are in MacWrite, you can choose the "About MacWrite" selection from the Apple menu. You will be shown the amount of memory left for your current work.

MISCELLANEOUS HINTS

A **telephone extension cord** may NOT be used as a substitute for the keyboard cord on your Macintosh.

WARNING. Do not place an external speaker too close to your disk drive. Its magnetic field may cause problems with your data on disk. This is particularly important as users begin to attach speakers for such applications as MusicWorks™ and SmoothTalker™ .

DON'T ASK. If you're in the habit of swapping disks a lot and there are a number of disk icons on your desktop, you can save yourself some time. After you have ejected a disk that you think you won't use for awhile, put the disk icon in the trash. The Macintosh will forget about its presence and not bother asking you for it.

MULTIPLE DESK ITEMS. You can have multiple notepads (or scrapbooks) available on your disk. Simply rename the notepad as Notepad #2 or with some other meaningful name. The system will then re-create a new Notepad and only look at that Notepad file. You can rename any of your other notepads to that name and look at it whenever you wish. Be careful when renaming, think through what you're trying to accomplish. Also, multiple notepads will take up disk space, so don't plan on keeping too many of them.

WATCH THAT BATTERY. The battery in your Macintosh does more than just run the clock. It helps maintain about 20 bytes (characters) of information about which ports are used for your printer and modem. If your battery is running low, your printer may stop working. If this happens, just exit the application, turn off the Macintosh, and take out the battery. The Macintosh then uses regular current to get the required information. Eventually, of course, you will want to replace your battery.

FONT EDITING. The new Resource Editor (available to developers and from some user groups) has a Font Editor that is better than the earlier versions that have been around for a while. Try it out and see if you like it.

RESOURCE FONTS. It's not necessary to store fonts in the System File. They can be installed as the resource font of an application or application document. Once installed as a document resource, such a font can be used by someone whose doesn't have that particular font in their System Folder.

CHANGING START-UP DISKS. An easy way to change start-up disks while you're in the midst of your work is to hold down ⌘ and Option at the same time and double click on the Finder icon of interest. The disk with that Finder icon will now be identified by the Macintosh as the start-up disk. (It will appear in the upper right-hand corner of the desktop.)

SPACE RACE. Never work with less than 20K of free space on a disk. If you try to print a MacWrite document with less space, you may ruin the document. You will probably need a good deal more free space for your MacPaint creations. It would be a

good idea to begin to have "storage disks" for finished work, and "working disks" for daily creations.

PRINT A WINDOW. You can get an instant copy of the active window by holding down the ⌘ key and the Shift key and pressing the number 4.

PRINT A SCREEN. You can get an instant copy of the current screen by pressing the Caps Lock Key. Then hold down the ⌘ key and the Shift key, and press the number 4.

DON'T REJECT EJECT. You should always use the Eject option to remove your disks from the internal and/or external drive. Other methods may result in a loss of your disk directory or files. Better safe than sorry.

BACK UP A BIT. Always, always make a Backup copy of disks that are important to you. With the Macintosh, this is a very easy process. Either use the application called Disk Copy or drag the icon of the original disk on top of the icon of the one to be used as a backup. Be advised: Using the Disk Copy application is faster if you have only one disk drive. (Treat yourself! Buy a second disk drive as soon as possible.)

EASY PRINTING. You can print your documents or pictures directly from the desktop. (1) Select the item (or items) that you want printed. (2) Choose the Print option from the File menu. (3) Select the appropriate settings (they 'll be the same if you have chosen to print several documents).

SAVE ENTRY TIME. Pressing the Enter key is the same as clicking OK in a Dialog Box.

EJECTING. Eject disks by holding down the ⌘ key and pressing E . If you have two disk drives, arrange the desktop so that the two disk icons appear. Type ⌘ A (selects all icons). Then type ⌘ E (ejects all disks).

DISK DIRECTORY. You can get a printed copy of your disk directory by clicking on the 💾 Icon to get the window of contents. Select by name from the View menu. Now print the active window by holding down the ⌘ key and the Shift key and pressing 4.

MOVING WINDOWS. If you hold down the ⌘ key before you drag a window somewhere, you can drag it without making that window active.

CALCULATOR CALCULATIONS. Cut and Paste a number (or a series of arithmetic operations) to the calculator and watch it work automatically. You can also use the keyboard to operate the calculator.

FIXING CRASHED DISKS. If you have a disk that is no longer working, try the following. Hold down the Option key and the ⌘ key while booting that disk.

WHAT'S IN A NAME. Disk names must be 27 characters or less. Application names, folder names, and document names must be less than 63 characters. Do not use a : or a . in any of your names.

SPARE SPACE. You should always ensure that there is some space on the disk that contains your application (MacWrite, MacPaint, etc.). This is true even if you're saving your work on an entirely different disk. The reason is that MacWrite needs disk space to store a copy of your document temporarily before it prints it out. MacPaint needs space to store old versions of what you're drawing. Keeping 80K to 100K of space should be sufficient.

MULTIPLAN®

In Multiplan, **numbers** will appear in cells as **right-justified**. Letters or **text** will appear **left-justified**. Recognizing this can sometimes help identify typing mistakes (such as using an L instead of a 1). Do not use commas or $ as part of your numeric data input. Cells can be formatted later to include them.

INTERNATIONAL MULTIPLAN versions are available. Microsoft has already developed a French and an Italian version of this spreadsheet. More adaptations are sure to follow.

HEADERS AND FOOTERS. In Multiplan, you sometimes create a header or footer of text that is too long to view in the Multiplan header box. Insert the I-beam somewhere in the header (or footer) text and drag it to the right until it bumps into the right edge of the header box. Your text will then scroll into view. The speed of the scroll is related to the distance between the I-beam and the edge of the box.

PRINTING LIMITATIONS. If your Multiplan spreadsheet is larger than 30K, you will not be able to print it. This is a limitation of the ImageWriter printer, which, in its current version, cannot print files larger than 30K. Expect this to change soon.

SPREADSHEET SIZE LIMITATIONS. In Multiplan, you begin to run into trouble if you use more than 5,000 cells for your model. This varies according to whether you have text, numbers, or formulas in them. Watch out for this if you're planning some large applications.

DISABLED KEYS. The Shift and ⌘ keys are disabled when the Caps Lock key is down.

TOO MANY CELLS. To prevent extra cells from being printed when printing a Multiplan template, put a Page Break immediately after the last cells you want displayed.

SIZE LIMITATIONS You'll get an Out of Memory message on a 128K Macintosh when you have used about 5,500 cells (no formulas being used). If you use formulas, you'll get the message when you reach about 4,000 cells.